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FLIGHT

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MILITARY AVIATION TESTS AT RHEIMS.—An interesting view taken from a Maurice Farman biplane of the ground, the hangars, and the laboratories of the Military Commissioners.

EDITORIAL COMMENT.

Millions for Aerial Defence.

The categorical statement made by the Paris *Matin* recently to the effect that Prince Henry of Prussia has presented a long memorandum to the German Emperor, embodying the results of his experience and experiments in flying, and asking that no less a sum than a million and a half sterling should be devoted next year to the purchase of aeroplanes for the German army, does not appear to have attracted a great deal of attention in this country. Possibly now that Parliament is sitting once more, Lord Haldane may be asked whether he is able to give any information as to the German plans for increasing the aerial armaments of the Fatherland, and the stock reply will be given that the Government is without information in the matter. Then it will drop into official oblivion until such time as next year's German estimates come before the Reichstag and we discover that someone else has stolen a march upon us.

If the *Matin's* story is correct—and it has all the appearance of verisimilitude—Prince Henry expresses his conviction that the dirigible has had its day and that the future is with the aeroplane—which is precisely what has become generally evident for a considerable time past. Still, according to our French contemporary, H.R.H. goes on to deplore the fact that the German *matériel* is far inferior to that of France, and points out that this is due to the fact that the German industry has not received enough encouragement from the State, and that this has resulted in Germany having to have recourse to other countries for the most efficient machines.

Our Home Policy.

If we read Great Britain for Germany, the complaints made in Prince Henry's report would exactly fit our case—except that they scarcely go far enough. But it is when he comes to figures that Prince Henry would make our own financial and military authorities fairly gasp for breath. Imagine! A million and a half sterling to be devoted to increasing the efficiency of Germany's military aeroplane service! Possibly—even probably—no such sum will be voted, at any rate for meeting the necessities of a single year, though the Germans certainly do know how to make sacrifices when it is the efficiency of their fighting services that is at stake, but it may be taken as read that the next estimates will embody a good round sum for the purposes indicated by Prince Henry. We are so busy with more or less visionary schemes of social reform that nobody seems to want and which promise to cost many millions of money, that a few paltry thousands is all we are likely to get for the purchase of new *matériel* and the training of our air corps, and for purposes of encouragement—nothing.

In the meantime, France goes steadily ahead with the perfection of her aerial resources. With a wise prevision she has set out on the task of creating a stable industry, and to that end is offering every encouragement to constructors to improve the breed of the machine, while to the men who fly the helping hand is extended at every turn. We are getting tired of pointing the same old moral. We had, in the *Auto*, in what are now the old days, the same unthankful task to perform in the case of the motor-car and its development. Then, as now, France had left us almost, it appeared, hopelessly behind.

But we have recovered our ground—indeed, we have done more, for we have passed our rival in the great race for supremacy of product and position in the markets of the world. By analogy, the same thing should happen in the case of the aeroplane. At least, it would appear that this is likely to be so, until we come to examine things in their true bearings.

The French Leading.

We are slow to begin, is the argument, but once we start we have a habit of moving so quickly that we rapidly overtake and pass our rivals. Now, if the development of the aeroplane was a purely mechanical and commercial matter, we might be content to simply deplore that we have been left so far behind in the race and to wonder when our constructors would take heart of grace and really begin to move. But when we come to look around us, we see that there is, in fact, but one nation which has so far made anything like real progress with its industry, that country, naturally, being France. The reason for this is, not that the French Government is any more enamoured than our own of doing the work that should be carried out by the private individual, but that the authorities have brought more imagination to bear upon the problem of the aeroplane in its relation to national defence than those of our own or other countries. Right from the beginning the French Government has taken a parental interest in the development of the new science, simply and solely because it unerringly recognised that the aeroplane of the future must become almost the dominating factor in matters of defence and aggression. In a word, it had imagination enough to see that the wars of the coming era will be decided in the air in some way or other, and that the Power which first secures command of that unstable medium is likely to hold it.

The rest have been simply playing with the problem, but now the portents foretell an awakening to the needs of the new situation—except so far as we are concerned. We go muddling on in the dear old way!

The Aeronautical Society.

We think it is opportune to remind our readers that it is still possible for a few days for them to become members of this, the oldest aeronautical body in the world, at the old rate of subscription, viz., one guinea, although after the end of the present month (Oct. 31), they can only secure admission on payment of the new rate of two guineas. In days gone by we have often had to break out into criticism of this the premier scientific body in aeronautics, and so far from regretting it we are glad to think that we have had some small share in bringing about the reform and rejuvenation of a most useful institution. Under its new constitution, we believe that the Society has a long career of usefulness before it, and that it will contribute very materially to the advancement of the science it exists to foster. It begins its new year under the happiest auspices, with new blood introduced to its Council—which, truth to tell, was badly needed—and with, we are convinced, a truer conception of its duty to the movement than it has ever had before. We wish it all success for the future.

A Study of Bird Flight

By Dr. E.H. Hankin, M.A. DSc.
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CHAPTER XXVII.—Movements Round the Transverse Axis in Flapping Flight.

It is a matter of common observation that just before perching a bird usually makes a few flaps of its wings. These flaps may seem a trivial matter to investigate, but it will be at once apparent that they are of considerable theoretical interest.

My first observation concerning this matter was as follows:—

June 26th, 1910.—At Ballia Ravine, 1.34.—A vulture seen gliding up the valley to settle. When near the tree on which it was about to perch, it flapped in order to gain height or speed. The direction of the flaps could be clearly seen to be up and down. Then for a few metres it glided without flapping. Just

is to say, stop-flapping occurred with the wings in the advanced position.

The explanation of this rotation round the transverse axis is both obvious and simple. In Fig. 46, at A, a bird is shown with its wings in the dihedrally up position. This, as already explained, produces a couple tending to rotate the bird upwards round its transverse axis. Obviously, this result depends on the resistance that the wings or wing tips experience to forward motion through the air. Therefore it is an adjustment that must be more efficient the faster the bird is moving. If the bird is gliding slowly, or if the bird wishes to check its speed, a different adjustment is employed. The wings are placed in the advanced position, as shown

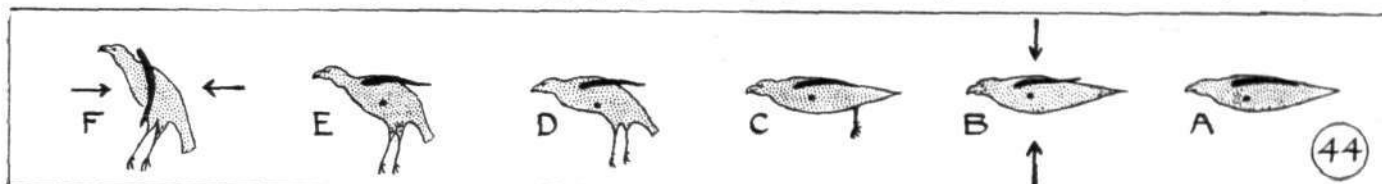


Fig. 44.—Stages in settling of a vulture. The bird is shown travelling from right to left—at A gliding, B flapping for a short distance. The arrows show the direction of the strokes. C again gliding, but with feet hanging down; D and E, body beginning to hang down below level of wings; F, after rotating through nearly a right angle, the wings have commenced "stop flapping." As shown by the arrows, the direction of beats in stop flapping is nearly horizontally to and fro.

before perching it hung down its body and again flapped. The direction of these flaps was quite clearly seen to be fore and aft. That is to say, these flaps were meant to act as a brake.

For the sake of clearness, I show these different stages in the process of settling in Fig. 44. At A the bird is shown gliding. Then at B it is shown flapping with strokes apparently vertically up and down, as shown by the direction of the arrows. At C the bird is again gliding, and its feet are hanging down. At D and E the bird continues to glide, but the legs and also the body are hanging down. At F the bird is again flapping, but with the beat of the wings in a fore and aft direction. That is to say, before this flapping commenced, or as it commenced, the wings rotated through a right-angle. To this form of flapping I propose to give the name of "stop flapping." In a later paragraph I shall explain

in Fig. 46 at B. When in this position the wings present a resistance to dropping downwards through the air that may be regarded as concentrated at a point, which point must be in advance of the centre of gravity. Hence there must be a couple that rotates the bird round its transverse axis. This, in fact, is the method used by cheels, crows, scavenger vultures, parrots, and other birds in settling either with or without stop flapping. It is noteworthy that advancing the wings causes rotation round the transverse axis, but no direct change of course. A scavenger, gliding downwards at a small angle with the horizon, may be seen suddenly to slightly advance its wings. The result is a slight rotation of the whole bird, including the wings round the transverse axis. That is to say, the angle of incidence is increased. Hence the wings act as a brake, and speed decreases. As the bird gets nearer its perch

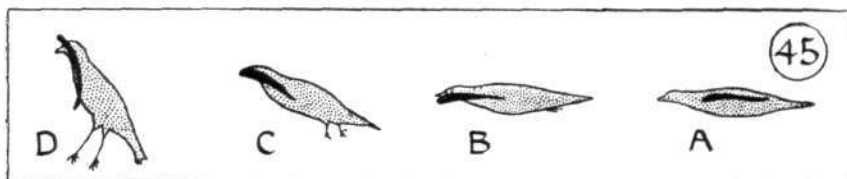


Fig. 45.—Stages in settling of a cheel—at A gliding; at B the wings are advanced, in consequence the bird rotates round its transverse axis as shown at C. At D stop flapping has commenced.

Fig. 46.—Diagram showing two methods of rotating round transverse axis. At A the wings are placed dihedrally upwards; at B the wings are shown advanced. Either disposition results in a couple tending to rotate the bird upwards (beak up, tail down) round the transverse axis.

the difference between stop-flapping and the flapping used by the poisoning kingfisher. The latter form of flapping lifts the bird. Stop-flapping, on the other hand, has no appreciable lifting effect, but tends to check the forward motion of the bird through the air.

Shortly after making the above observation, I noticed a cheel settling. In this case there was no hanging down of the body before the commencement of stop-flapping. At the moment that the stop flapping commenced, not only did the wings change their plane of action, but also there was a simultaneous rotation upwards of the whole bird round its transverse axis. How this rotation occurred was shown to me by observation of yet another cheel that did not perch by the usual method, but by the procedure shown in Fig. 45. At A this cheel is shown gliding towards its perch with the wings "straight," that is to say, with their centre of effort nearly or quite on a level with their centre of gravity. The first preparation for perching made by this cheel was to put its wings in the "advanced" position as shown at B. The bird immediately began to rotate round its transverse axis, as shown at C. After the rotation had occurred, stop-flapping began, as shown at D. That

there may be a further advancing of the wings. The consequent further rotation round the transverse axis acts as a stronger brake, so that the bird may drop vertically on to its perch. In a slight wind, an eagle, for instance, may stop without any stop flapping. It is striking to see the bird gliding along at a height of two or three feet from the ground, suddenly drop its legs, and perch on a shrub or other projection without any apparent effort to check its speed beyond the advancing of the wings and expansion of the tail. While thus checking speed the tail is expanded and depressed, so that its surfaces may, in some cases, be placed almost at a right angle to the line of flight. In the case of the green parrot, stop flapping always occurs, and the wings may clearly be seen to be in an advanced position.

Rotation round the transverse axis may also occur when the bird is swooping downwards at high speed. If in such a case the rotation is caused by advancing the wings, there is no change of course, but speed is checked. If, on the other hand, in the case of cheels, rotation is caused by placing the wings in the dihedrally-up position there is a change of course and less loss of speed. This

is the adjustment used by cheels when swooping downwards to snatch a piece of food from the ground, or occasionally from a tray carried on a man's head. The food is always seized by the feet. The bird swoops down, catches the food without interruption of its flight, and glides upwards almost to its original height. This curved course is due to delicately applied adjustment of the dihedral angle. On the other hand, as already described, in diving, placing the wings suddenly and strongly in the dihedrally-up position, causes a sudden rotation, and consequently acts as a break. Another case in which the dihedrally-up position acts as a break will be described in the chapter on the functions of the tail.

Conversely flapping with the wings retired must cause rotation round the transverse axis in the opposite direction. This, in fact, corresponds with my observations. Both in the case of pigeons and green parrots, when flying downwards, I have been able to see that their wings are flapped in the retired position.

In slow horizontal flight the wings are flapped in a more advanced position than in fast horizontal flight. Hence, in slow horizontal flight (Fig. 47 A), during the down stroke, the wings move downwards and forwards. In fast, horizontal flight, this forward trend of the wings on the down stroke, if it exists, is too small to be observed. (Fig. 47 C.)

In the case of the adjutant, I have been able to observe the change from flapping with wings advanced to flapping with wings straight. The following is an extract from my diary:—

August 8th, 1910.—At Jharna Nullah. 6 p.m.—About 200 adjutants were settled. No birds up, not even cheels, except a few birds in flapping flight, mostly when disturbed. The air was nearly calm, after a succession of showers. Sound travelled far. The noise made by the beats of the wings of adjutants and vultures, if they started flying, could be clearly heard, even when the birds were at some distance from me. I sent a boy to start the adjutants. This he did cleverly in such a way that they got up, generally one at a time, and flapped past me broadside on. I thus observed the movements of between 50 and 100 of these birds under very favourable conditions. The advance of the wings on the down stroke was clearly seen in adjutants in horizontal flight. In the

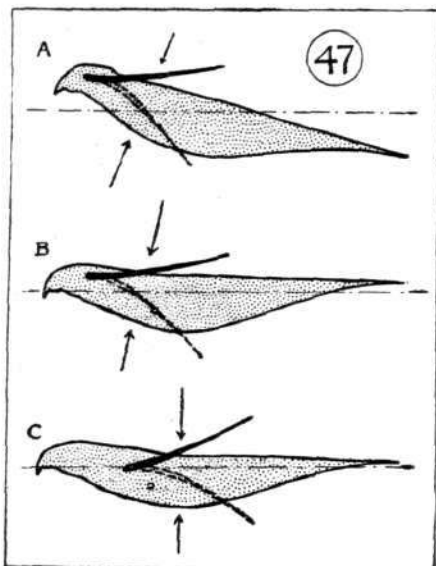


Fig. 47.—Diagram showing horizontal flapping flight at different speeds. A, slow; B, medium; C, fast. The arrows show the direction of beat of the wings. Note that the slower the flight the more are the wings advanced. The cause of this will be explained in a later chapter. In each figure the wing section drawn as a continuous line represents the disposition during the down stroke. The dotted line represents the disposition during the up stroke. B may be taken to represent the ordinary flapping flight of the larger birds. C is only seen in fast flight of small birds.

case of an adjutant that was flying upwards at an angle with the horizon, the advancing was still more marked, so that the direction of the beats was nearly horizontal.

After they had flapped to a height of between 10 and 15 feet, several adjutants were seen to commence gliding. The last two flaps before gliding were, in each case, directly up and down without any advancing on the down stroke. Presumably in flapping with advanced strokes, the centre of effort of the wings was in advance of the centre of gravity. The two straight up and down strokes were carried out with the centre of effort, vertically above the centre of gravity. That is to say, these two flaps were a preparation for gliding in a horizontal direction. They indicated an approximation of the centre of effort and centre of gravity, as must occur when gliding in unsoarable air.

The following observations are of importance:—

September 25th, 1910.—At Jharna Nullah, at 10.30 a.m.—An adjutant flapping with wings advanced was seen to change to straight up and down flapping as a preparation for gliding. At the moment of this change, rotation downwards of the body of the bird round the transverse axis was clearly seen. This rotation may have been about 5°.

An adjutant gliding downwards at a small angle with the horizon was seen to change its direction, and glide slightly upwards for several metres before commencing flapping flight with wings in advanced position. The difference between the two directions may have been as much as 10°.

That is to say, in these cases the transverse axis rotation caused by changing the wings from the advanced to the straight position was actually observed.

Cheels when gliding are often followed and teased by crows. Under these conditions, to escape the crows, they sometimes make a sudden flap, which changes their direction, causing them to rotate on the transverse axis, and glide upwards. At other times they make a flap which changes their course to a downward direction. At the time of first seeing this, I was unable to understand how a beat downwards of the wing could cause the bird to travel downwards. Now, it must be clear, in this latter case the wing was flapped when in the retired position.

The following observation also receives an easy explanation:—

July 5th, 1910, at 5.9.—A stormy soarable wind. A cheel seen gliding up wind about 3 metres above the roof of my house where I was sitting. Three crows were in attendance teasing the cheel. The cheel was gliding with wings flexed, and the wings were seen to be frequently advanced or retired. Each movement, whether forward or backward, shifted the wing tip about half an inch from its normal position.

In the light of our present knowledge, it appears probable that the advancing and retiring of the wings were movements preparatory for flapping in either an upward or a downward direction. This is a first example of an "anticipatory movement." Other cases of anticipatory movements will be described in the sequel, one of which will be seen to be of some theoretical importance.

Postscript.—Since writing the preceding chapter, I have found that Lilienthal discovered that rotation round transverse axis may be produced by advancing the wings. He expressed himself on this subject as follows:—

"Accordingly the bird can easily do without its tail, as it possesses another highly efficient means of rising or sinking in the longitudinal direction. In order to be raised longitudinally it is only necessary for it to shift forward its wings, and so to advance their centre of supporting effort. Similarly by drawing its wings backwards, the front part of the bird sinks. This latter movement is used by birds of prey when diving from a height."—("Der Vogelflug," page 73.)

(To be continued).

Mr. Hucks Concludes His Tour.

LAST week Mr. B. C. Hucks concluded his three months' tour in the West of England, at Gloucester, where he made flights each day. During the early part of the week the wind was very troublesome, but on Monday he was out twice, and on Tuesday three times. Wednesday was much more suitable for flying, and Mr. Hucks started off with a trial of 18 mins., during which he got up to a greater height—800 ft.—than the Cathedral. In a second trip he got up to 1,000 ft., while in a third he made an attempt to beat his own altitude record of 3,500 ft., but was not quite successful. On Thursday four flights were made, and in the second Mr. Hucks came down in the local football field, causing a stampede among the players. The concluding flight was in the nature of bomb-dropping practice, when Mr. Hucks made some very good shots. With the wind blowing at a rate of 30 to 35 miles an hour, work on Friday was limited to two flights, one of 6 minutes, and the other

of 35 minutes, Cheltenham, where an exhibition had been given during the previous week, being visited during the latter excursion. The worst weather of all was experienced on Saturday, when the wind got under the hangar and lifted it and the machine clear of the ground. Fortunately the damage done was not very great, and the mechanics were able to get the machine in trim again by a quarter to five in the afternoon, when Mr. Hucks made three short flights in a very gusty wind.

A Model Club for Worcester.

MR. STANLEY A. SEARS, head of the engineering department of the City of Worcester Victoria Institute Science and Technical Schools (Sansome Walk, Worcester), has been approached by some of his students with respect to the formation of a model aeroplane club in the Worcester district.

Mr. Sears would be glad to hear from anyone interested in this matter, with a view to calling a preliminary meeting.

SUBSIDIZED SHEDS.

A SUGGESTION that is in the air just at present is to the effect that the Government might devote a little money for the purpose of subsidizing aeroplane-sheds in different parts of the country, in order that military pilots developing their experience by cross-country flights might not always be limited by the necessity of returning to the starting-point the same day. Because it concerns a grant of Government money, such a suggestion is apt to receive the short shrift that is usually the lot of such propositions. The country may be rich, but it cannot afford to finance all the progressive schemes that are put before it, and it behoves those who fancy one in particular to think twice, and think deeply, before they become advocates of its favourable reception by the powers that be.

In this case, the idea of subsidizing aeroplane-sheds improves on acquaintance. There is a means here of doing much for the progress of flight at a comparatively small outlay, and we are not at all sure that the government might not go farther and fare worse in other schemes that have a more alluring appearance than has this at first sight. Flying has come to such a pass now that there are any number of pilots just dying to be off for a long journey, but the simple truth of the matter is that the game is hardly worth the candle if they have to risk their aeroplanes out in the open for a night.

The best way to appreciate the probable effect of carrying out the suggestion is to imagine that the sheds are already in existence. Suppose, for the sake of example, that such sheds existed in the vicinity of Dover, London, Cambridge, Peterborough, Lincoln, York, Darlington, Newcastle, Berwick and Edinburgh. There are a series of comparatively short-distance stations on what is practically a due northerly route. Glance at a map of England, and it will be seen that it is possible to similarly link up Northampton, Birmingham, Manchester and Liverpool in a slightly zig-zag line to the north-west. Or, again, Oxford and Gloucester lie *en route* to Fishguard, which has become the starting-point for so much transatlantic traffic, while Salisbury and Exeter would similarly form a line of communication with Plymouth.

How many places are these that have been mentioned at random? Twenty? It is clear then that a couple of thousand pounds might go quite a long way towards weaving the first threads of that network of flight stations with which the eye that perceives the future sees Great Britain must some day be covered.

After all, we have got to take flying as it is, as something that exists with us already, as something that marches forward with leaps and bounds. And, really, it is difficult even for those who live in the midst of the movement to always appreciate and grasp just how strong is the grip that this new thing has taken upon life. The achievement of flight itself was never a more distant vision of the future than is the idea of an established aeroplane service to many not necessarily conservative minds to-day. The reason is not that people doubt or have no faith, but merely that events march too quickly for minds that are otherwise engaged to properly correlate the present with the future. Men fly; and given a sound training, some experience and a fair measure of good judgment, it may honestly be said that they fly safely. Every day, certainly every week, new names are added to the list of those who have secured their *brevets*. Some do so more quickly than others—some too quickly perchance for their own security; but the fact remains that the civilised world is slowly but surely learning to fly.

Now, the imagination that has prompted men to take their lives in their hands in order to go up in the air is not such a dull thing that it will be content to circle around aerodromes, make spasmodic escapades abroad, or wait until some tempting prize induces them to venture further afield under the ægis, for what it is worth, of an official organisation. The minds of the men who are fascinated by the whole movement of flight are not made of such stuff; the imagination that led them to do these things when thus much was an accomplishment worthy of the effort for its own sake, will surely and certainly lead them to show what flying may mean in a nation's social economy.

Hitherto the military aspect of the situation has been predominant, because it alone has possessed that obvious seriousness of purpose that grips the intellect. Anything that has to do with war is serious, and although we are not quite sure that everyone who swears by the aeroplane for military work knows in detail quite what the aeroplane can do for armies, nevertheless all are unanimous in giving allegiance to the broad idea. And, unquestionably, this attitude of the outer world has given an immense impetus to the movement. In France especially, the actions of the Government have been of immense service all round. It would have been far more difficult to have brought about the same support by civilian arguments. The community at large is far more critical, though it

may understand as little about questions affecting the future development of commerce and general public service.

Nevertheless, it is in these fields of activity that there are now signs of stirring life. It needs but the right spark to start the spreading flame. What do these attempts at postal services and at long-distance passenger journeys foreshadow if it be not a desire on the part of someone to try to show the utility of the aeroplane in civilian affairs. Too often, when these matters are broached, the idea is criticised out of court by making comparisons with the more highly organised present-day modes of work. People oftentimes seem to forget that new things do not come into existence in a perfected form, and that it is generally only out of small beginnings that the greatest and most secure futures are evolved. It is easy enough to point out the limitations of flight with the machines at present available, but suppose there are certain things, perhaps only one or two at the most, that can now be accomplished, such criticism loses much of its logic, because in the doing of those small things the seed of development is already sown.

It is of little moment to say that an aeroplane cannot be built to give the accommodation of a railway train, or that it cannot ordinarily carry either the goods or the people that may safely be placed in a motor car. The real question is not one of comparison, but whether the aeroplane can carry anything at all that is useful. Well, from the day that the first pilot made a journey in the air, the aeroplane could always carry one thing, and that was a message.

There are many modern ways of taking a message among the ordinary conveniences of civilised life, but there are fewer in the environment of a military camp, and oftentimes a message is of more consequence than anything else to an army. That is one reason why the military aspect of aviation has always been to the fore.

There is no point just at the moment, perhaps, in an aerial civil post, and so, to the casual thinker, the aeroplane is useless in this field of work; but it is not only the level-headed business men who judge by comparison with things as they exist who are the only factors to be considered. There is always an element of romance in human nature sufficient to leaven the dough of commercial existence, and there are generally to be found some people who are willing to pay good coin of the realm in support of an enterprise that is not necessarily in a strictly utilitarian field at all.

It was a useless journey at the best to make a trip round the big wheel at Earl's Court, but there were people enough who bought a ticket there that would have carried them most of the way home if the same money had been paid at the railway booking office. Who shall say how many people have bought tickets for flights at Brooklands since Keith Prowse had the enterprise to put up an office, who would not ordinarily have plucked up the courage to make a demand for something of which there was no obvious supply.

It is rather the same thing in the matter of aeroplane sheds in England. If they existed all over the country, who can say what flying might soon become? Who knows what enterprises might be started, and how is it possible to tell of the many useful things that might be done? The excuse to build such sheds is possibly not yet sufficient to warrant the capital outlay from commercial sources, and yet there seems little doubt from what we have said that they would be a powerful factor in the development of flight if they were put up.

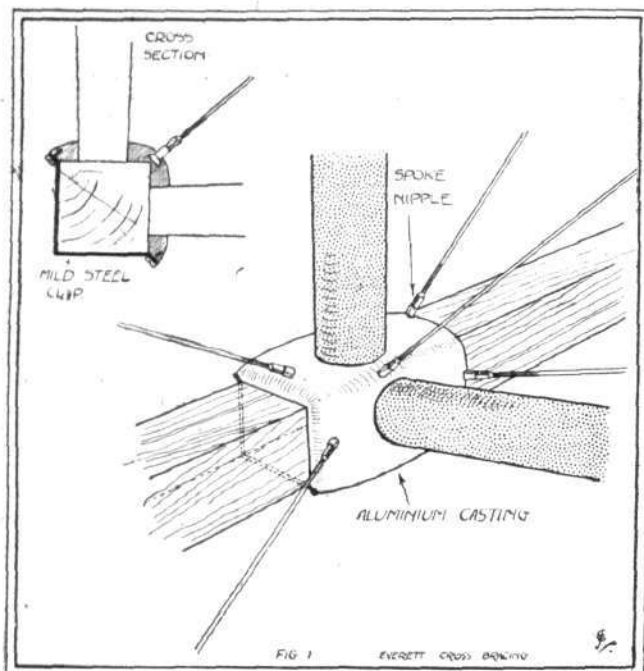
It is to the interests of this country that Britishers should lead in flying, and if the Government take this view, as we may suppose they do, we suggest that the tangible advantage of such a scheme to the development of military aviation might prove a sufficient excuse for them to take action in the general good.

That there would be an adequate response on the part of those who are willing to risk something in the matter we have little reason to doubt, for it is not as if a shed was a useless commodity. With some trouble spent in investigating the possibilities of different localities there is no reason to suppose that it would be impossible to select suitable landing sites in useful places. Such a thing cannot be done in a moment no doubt, nor is it possible to say what is practicable and what impracticable without making investigations on the spot. The all-absorbing fact with which we are ever faced is this, that aeroplanes fly, need landing places and shelter. If aeroplanes are to make regular journeys in the future such landing places and such shelters must be created. Since, therefore, they have got to come to pass, why not try and make a beginning now while it is possible to do so with forethought and discretion and also in such a way as to contribute something material to the progress of flight?

"FLIGHT" TECHNOLOGY.

TWO INTERESTING METHODS OF CROSS-BRACING.

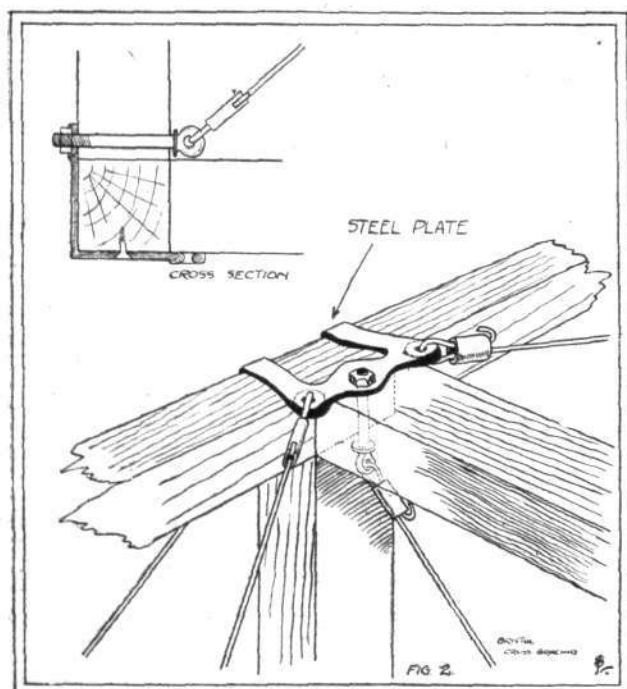
IN connection with aeroplane bodies built on the box girder principle, the method of attaching and straining the cross-bracing wires forms a most interesting problem. Every constructor has his own pet idea



in this regard, and it is curious to note that methods involving piercing of the longitudinal members are much in the majority.

Naturally the longerons are considerably weakened if many holes pierce them and to ensure the maximum factor of safety, it is in their interests to devise some scheme whereby such drilling is eliminated.

Of the two accompanying sketches the first illustrates a method



which fulfils these conditions, and the second shows a scheme which only falls short to the extent of a small wood screw.

Fig. 1 represents the method that is employed on the Everett monoplane. An aluminium casting is clipped to the longitudinal member by means of a steel angle-plate. Two large elliptical holes in the casting accommodate the transversal struts, and five smaller ones, countersunk, receive the five spoke-nipples, which serve both to anchor and to tighten the bracing-wires. The wires

are cut to the correct length and threaded at each end. Straining is effected by a simple key that engages on the square sectional part of the nipple.

Fig. 2 illustrates the cross-bracing of the new Bristol monoplane. A mild-steel right-angle lug serves as an anchorage to the longitudinal spars, and its position is "centered" by a small wood screw that is not intended to take any strain. The four wires from each plate that truss the sides of the girder are attached to reinforced eyes provided for the purpose.

These wires are carefully bent to the right length, and fixed in position without any provision for adjustment of the tension.

The diagonal wires are anchored to eye-bolts passing through the transverse struts, which is a convenient method, as not only does it allow of adjustment to these wires, but serves to keep the struts in position.

ABOUT CASTOR OIL.

WHY is castor oil used so extensively for lubricating aeroplane engines? The demand for castor oil as a lubricant in aeroplane work was created by the advent of the air-cooled rotary engine, and even though it has succeeded in serving its purpose more or less satisfactorily it is curious that it has not yet been superseded by an oil that would lubricate much more effectively.

The purest castor oil is a vegetable product obtained by pressing the seeds of the castor-oil plant in hempen bags by means of hydraulic or screw presses, after they have been subjected to a crushing process between heavy rollers. The crude oil thus obtained is refined by being digested with water at boiling point, an operation that separates out the albumen and other impurities by coagulation.

Highest-grade oil is prepared in this way, and possesses a light yellowish colour. Secondary grades are obtained by steaming the seeds and then subjecting them to a further pressing. Pure castor oil is completely soluble in its own volume of absolute alcohol which test should prove useful to those aviators who doubt the purity of their lubricant.

The advantage that castor oil possesses as a lubricant for rotary engines is due to its volatility, for before it has time to accumulate on such vital parts as the sparking-plug points, it evaporates and the hard flake-like deposit it leaves behind is blown out by the scavenging action of the exhaust. If ordinary motor oil were used the electrodes would soon become flooded and misfiring would result. Although castor oil is so volatile, it is doubtful if the heat caused by the explosion of the mixture is sufficient to effect the complete evaporation of the oil film on the cylinder walls, for otherwise how would one account for the oil saturated condition of those surfaces in the wake of the exhaust. It is clear that quite a considerable portion of the lubricant exudes in the form of spray.

If castor oil is subjected to a constant heat for a considerable time, roughly 50 per cent. of its volume is driven off in the form of vapour and what is left is a hard brownish-coloured transparent cake of solid matter that can be chipped with a hammer. From experiment readers can draw their own conclusions as to the true value of castor oil as a lubricant pure and simple.



A Memorial to the Hon. C. S. Rolls.

THERE was a good gathering of people to witness the unveiling by Lord Raglan of the Bronze Monument which has been erected in Agincourt Square, Monmouth, to the memory of the late Hon. C. S. Rolls. The statue, which is the work of Sir W. Goscombe John, R.A., shows Mr. Rolls in his flying costume looking at a model of his aeroplane, and three plaques on the sides of the plinth represent Mr. Rolls motoring, ballooning and flying respectively. Among those present at the ceremony were the late aviator's parents, Lord and Lady Llangattock, Lady Hood of Avalon, Sir John and Lady Shelley, the Hon. J. M. Rolls, and the Mayor and Mayoress of Monmouth.

The Wright Glider Experiments.

EXTRAORDINARY results are being obtained by Messrs. Orville and Lorin Wright and Alec Ogilvie in their glider experiments at the Killdevil Hills, North Carolina. On Thursday of last week Mr. Orville Wright succeeded in gliding for 1 min. 15 secs. In the course of one glide he was able to keep the glider motionless for five seconds at a height of 125 feet, and in another test he kept it still for a similar period at 60 feet high. A bit of a spill at the finish fortunately resulted in nothing worse than a good shake-up so far as the aviator was concerned. Mr. Orville Wright is said to have expressed the opinion that they will succeed in making glides of a mile or more and be able to poise in the air for five minutes or longer, all of which we sincerely hope will come true. Experiments are also being carried out with the automatic stabilising apparatus which was described in these columns some time ago when the patent covering it was issued.

FROM THE BRITISH FLYING GROUNDS.

Brooklands Aerodrome.

WIND and fog, the aviator's bugbears, prevented much being done at Brooklands last week. Wednesday was very foggy early in the morning, but got clearer later on, when the energetic Bristol school were hard at work. Fleming went up for a solo flight to try the air, and reported it not bad, afterwards taking Capt. Harrison for a passenger flight. He then handed the machine over to his pupil, who made some good straight flights. Lieut. Harford then followed, but did not make any circuits, as the wind was just wagging the flags, and he thought it might be a bit tricky. Collins Pizey afterwards ascended with Slater, one of the Salisbury Plain pupils, as passenger. Fleming took Capt. Roberts for a passenger flight. Raynham had the Avro biplane out, and was doing circuits at over 1,000 ft. He followed the track round for two circuits, and was timed to do 48.5 m.p.h. Taking all things into consideration, this was not bad for a machine weighing 1,200 lbs., and fitted with a 45-h.p. Green. The Elephantoplane was flying very strongly, and is none the worse for her introduction to the sewage farm. The Pashleys have at last got their Humber monoplane going well. It rises like a Gnome-Blériot, and is quite fast, well over 50 m.p.h., I should say. Lieut. Porte, of the Deperdussin Syndicate, had the new racer out, and did some circuits in fine style. It is not as fast as we understood it to be, but all the same, it's "a pretty fast proposition," as the Americans say. Gordon Bell had the two-seater out, and took up a passenger to a height of about 600 ft. Mrs. Hewlett, of the Blondeau-Hewlett combine, was out on the British Farman, flying circuits in grand style.

On Thursday, Raynham started for the Michelin in rather a bad fog. After going a few circuits he decided it was not good enough, and as the engine missed once or twice he came down. Later on, Spencer made a few circuits on his Spencer biplane, taking up as passenger his pupil, Mr. Frank Ballard.

Bell carried Garne in the two-seater Deperdussin to a good height, ending up with a half-spiral *vol plané*. Baldwin was rolling and making straight flights on the school taxi; he has picked the control up very quickly and should make a good flyer. Sabelli on the same machine landed, after a straight, in the sewage farm, doing a fair amount of damage. Garne then made some straight flights on the 28-32, and Bell made a fine flight at 1,000 ft. with a passenger.

Fleming was out on the Bristol flying well, taking as passenger Capt. Harrison. Lieut. Harford then made a couple of circuits in fine style, and Harrison had some rolling practice. Unfortunately he turned too quickly up by the sheds with the result that one of the wheels buckled and broke the landing chassis.

Saturday was too awful for words, and Sunday was chiefly taken up with rain storms. On Monday Pizey was out with Capt. Roberts on the Bristol, and Fleming took up Major Benwell for a few circuits. The rest of the day was very windy and nothing was done with the exception of Raynham making some straight flights on the Avro to test a new propeller. Tuesday was also abominable, and the only one out was Raynham, carrying out a few test flights preparatory to an attempt on the Michelin, which will be made on the first seasonable day.

Filey School (Blackburn Aeroplane Co.).

MONDAY last week Scott was out doing good rolling practice for about two hours, and on Wednesday he was at work again for about half an hour doing straight runs with tail well up. Although much inclined thereto, he wisely did not attempt to lift, owing to wind being altogether too strong.

Lanark Aerodrome (LANARK, N.B.).

OWING to the inclement weather which continued throughout the past week, there is little to record in the way of flying, but the pupils found plenty doing in the hangars, where their energies were centred on the strengthening of the school Blériot, so that the machine may be able to stand a severe landing without damage. On Friday afternoon, a short-lived calm enabled Jackson to get in a little practice on the Deperdussin, but the wind again springing up put an end to further flying for the day. On Monday two French pupils joined the school, Mons. Baumann and Dubois, to take a course of tuition.

Liverpool Aviation School, Sandheys Avenue, Waterloo.

THE weather has been anything but propitious for flying during the past fortnight. On Saturday, the 14th, however, Mr. Melly took out the school Blériot and made one or two short flights. The wind proved exceedingly treacherous, so he thought it wise to bring down the machine again. On the 18th Mr. Hardman was out with the intention of trying some hopping, but contented himself with rolling, as the wind was more than he cared for.

London Aerodrome, Collindale Avenue, Hendon.

Blériot School.—No flying was possible by the pupils on Monday and Tuesday of last week on account of the high wind, but on Wednesday Messrs. Wilson, Prensiell, Sacchi, and Allen were making straight lines.

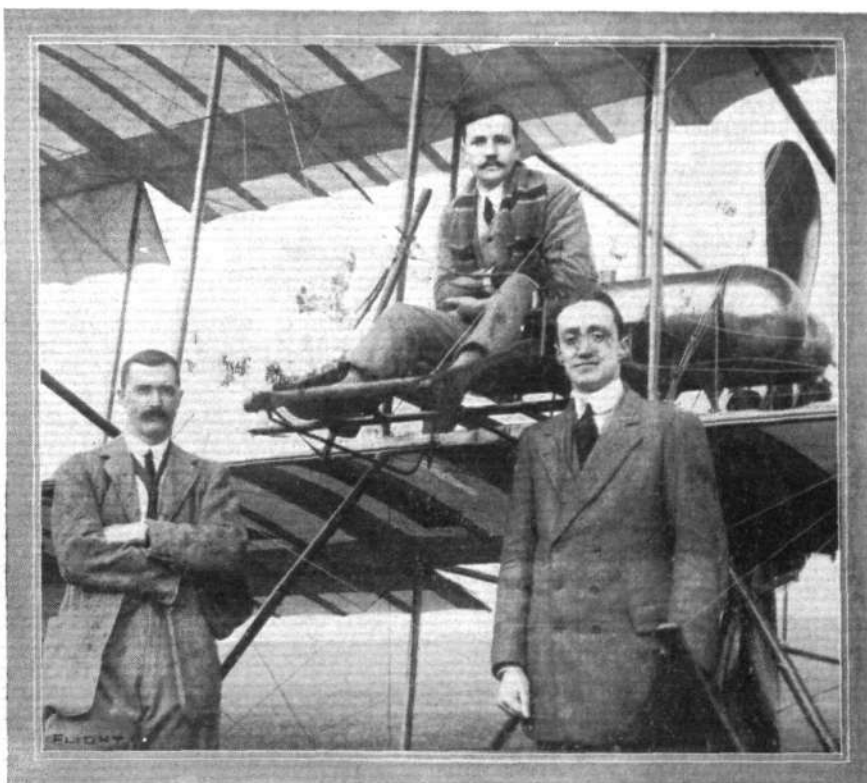
On Thursday again the same pupils were making straight flights, with the addition of Mr. Tremlett, and showing considerable progress.

On Monday and Thursday also, M. Salmét, one of the instructors at the school, carried out several excellent trial flights on the Blériot machine flown by M. Beaumont at Hendon. This machine will now soon be in the hands of Mr. Driver. M. Salmét also flew his own machine to test several new kinds of propellers.

On Friday and Saturday, on account of the bad weather, instruction was given in the sheds to the few pupils who had turned up on chance of a flutter during a lull in the wind.

Grahame-White School.—Throughout Tuesday last week the weather was none too pleasant for flying on account of the fog. This, however, did not deter Mrs. Stocks from bringing out the Gnome-Farman at about 4 o'clock and executing a flight of half-an-hour's duration at an average altitude of 300 ft. In the course of the flight she made circles both to the right and to the left-hand, and descended from that altitude with the engine switched off, making a perfect landing.

The following afternoon, soon after lunch-time, Lieut. Parke mounted the school Farman, and flew for three-quarters of an hour by way of a test before taking up in succession three ladies and one gentleman as passengers for short trips round the aerodrome. Following these excursions he gave instruction to the pupils, Fowler and Lyles, by giving them each flights of ten minutes duration. Then, setting off *solus*, he rose to 400 ft. and left the ground, flying in the direction of Harrow. Circling this town, he returned to headquarters after an absence of half an hour. The trip must have been none too pleasant on account of the thick mist that was prevalent at the time. The day's proceedings did not terminate until darkness set



AT THE BROOKLANDS "BRISTOL" SCHOOL.—In the pilot's seat Lieut. Harford, on the left Capt. Harrison, and on the right Mr. Fleming of the Bristol Co.

in, the last flight of the day being carried out by Mrs. Stocks, who flew for four laps at a 200 ft. level.

Tuition began next morning at an early hour, when Lieut. Parke came out on the school machine, and made a short flight before taking up Fowler as passenger by way of tuition. Later on, Fowler took charge of the lever, and with his instructor in the passenger seat, put in some useful practice at straight line flying.

In the evening, Lieut. Parke was again flying, his trip on this occasion being more in the order of an exhibition, for he took his corners with high banking, and carried out those evolutions peculiar to this branch of the art. Mrs. Stocks then took charge of the machine, and circled the aerodrome for some ten minutes, mounting to 300 ft., following which Fowler was given instruction in the course of a flight of six circuits.

The weather on the three following days was appalling in the extreme and all thought of flying had to be banished. On Tuesday morning last, however, despite the fresh breeze, Mr. R. T. Gates put in a quarter of an hour's practice on the E.N.V.-Farman, making short flights from end to end of the ground.

Valkyrie School.—Wind and weather was responsible for very little flying during the past week. On Wednesday evening last week Mr. Barber made a fine flight on "Valkyrie 10," quickly attaining an altitude of 500 ft. After accomplishing several circuits, he descended with a splendid spiral *vol plané*. Capt. Loraine was also flying on the school machine, making circuits at a good height in spite of a 10 mile-an-hour wind. He is ready to fly for his *brevet* any day now. Later, Mr. Barber took up a passenger for several circuits, and then flew the school machine.

On Thursday Capt. Loraine and Mr. Barber were both up on the school machine during a temporary lull in the wind, but the wind soon rose again and prevented further practice. In the afternoon Capt. Loraine again got in some good practice, flying several circuits. The school pilot then made a short flight, but heavy rain terminated proceedings.

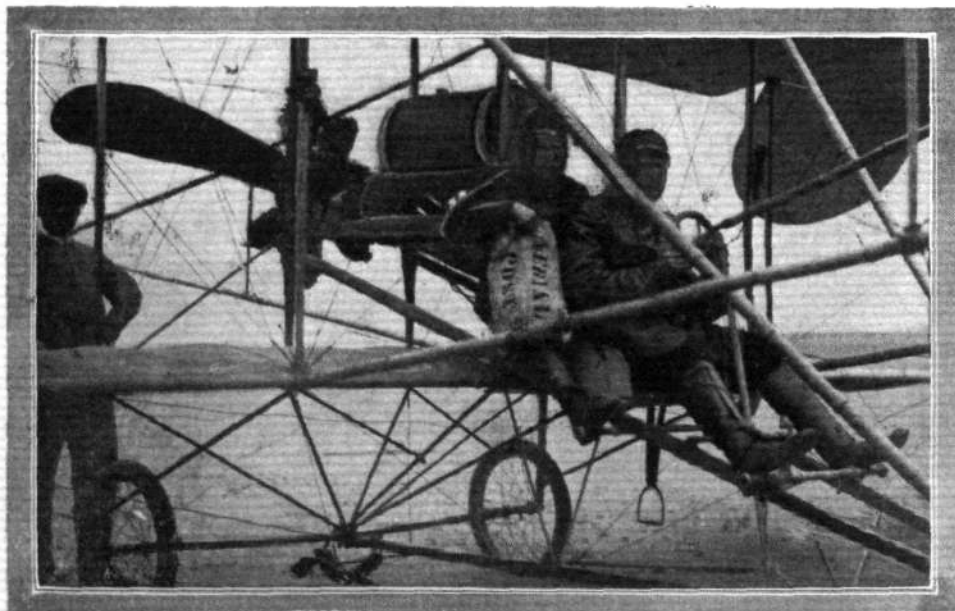
Portholme Aerodrome, Huntingdon.

On Tuesday, the 17th inst., Mr. Moorhouse started from Huntingdon at 8.50 a.m. on his parcel post contract flight for Northampton. Owing to the fearful wind he had to land at Westley's Meadow, Nunn Mills, at 9.10 a.m. Next day he made a move from Northampton racecourse at 12.40 p.m. with his load of boots, and finding fog barring his way he came down at Fenny Stratford at 1.20 p.m. Next day he restarted from Fenny Stratford at 11.16 a.m., and landed at Hendon at 11.50 a.m. with his parcels intact. Mr. Moorhouse remained at Hendon for a change in the weather before returning to Huntingdon, where he has other contracts to fulfil.

Weather has been against work in general this week, but Mr. W. Roberts-Bruce made some straight flights.

Salisbury Plain.

A TERRIFIC gale was blowing the whole of Monday last week, flying being rendered absolutely impossible.



Mr. G. Higginbotham immediately before the start for his aerial post trip from Freshfield to Southport, as recorded in last week's issue. Accompanying Mr. Higginbotham is Mr. A. Pochin's mechanic. Note the stirrup for helping to mount the machine, and the mascot on one of the stays.

The wind of the previous day had not abated on Tuesday in the morning. Busteed went up in the evening, as did Jullerot, but they found the conditions anything but favourable for pupils' solo flying. Busteed took Mr. Dacre for a passenger flight, after which nothing further was done.

If anything, the wind appeared to have increased in vigour next day, and after Busteed had ascended with Mr. Dacre, it was deemed advisable to postpone further work. The conditions somewhat improved in the afternoon, when Jullerot made a trial flight, after which Lieut. Cross successfully passed the tests for his certificate, being observed by Baron Roenne and Mr. Cockburn. This officer joined the school on September 6th. He was ready to pass his tests some days ago, but the weather we have recently been experiencing made it impossible. Lieut. Cross' tuition has, therefore, lasted about five weeks, during which there have been many days on which flying has been out of the question. He completed his course without a smash. A thick mist prevented any further work being done.

No flying was possible again the whole of Thursday on account of a hurricane blowing. Work was very brisk, however, in the hangars.

Friday saw no improvement in the conditions which prevailed on the previous day, therefore all thought of flying had to be abandoned.

Busteed set out in the evening on No. 43, Gilmour also being on the two-seater monoplane, but the conditions were very bad, and work therefore had to cease.



Two Fatal Accidents in America.

CONFIRMATION is to hand of the fatal accident which overtook Cromwell Dixon on October 2nd. On Sunday, Sept. 30th, for a prize of 10,000 dollars, he had flown across the Rocky Mountains, from Helene, Mont., to Blosburg, 18 miles away, and later in the day flew back again, the outward journey taking 26 mins, and the return 43 mins. He had to rise to a height of 7,100 ft. to get over the mountains. On the following Monday he was flying a Curtiss biplane at Spokane, Wash., when the machine suddenly side-slipped, and he was unable to correct it before it fell on to the railway lines. Dixon sustained such severe internal injuries that he died a few hours later. Dixon made a name for himself some years ago by building a small dirigible himself and fitting it with a propeller driven by foot pedals arranged as on a bicycle. With this he made several trips at various fairs, and afterwards built another airship fitted with a motor with which he toured the States.

While trying to do some extraordinary "stunts" on a Curtiss biplane at Macon, Georgia, on Thursday of last week, Eugene Ely, who will be remembered as having made some successful experiments in landing on a liner, met his death as a result of injuries sustained in a fall. He was doing a very steep *vol piqué*, when the machine apparently got beyond his control, and instead of straightening up with the object of rising again, simply continued on its way and dashed to the ground. The pilot tried to jump clear of the machine but did not succeed and was injured so much that he died shortly after. At the Nassau Boulevard meeting he secured five prizes totalling 1,400 dollars and was placed fourth at the end of the week, the ones in front of him being Sopwith, Grahame-White and Melling.

A Mid-Channel Adventure.

THREE balloonists who left the grounds of the Aero Club of France at St. Cloud at midnight on Wednesday of last week had an exciting experience in mid-Channel. The balloon was the "Helene," piloted by M. E. Bourderiat, accompanied by M. Darnis and M. Dourette. They made good progress until about half-way between Dieppe and Newhaven, when the balloon suddenly lost buoyancy and descended to the sea. Fortunately a passing fishing smack was able to rescue the aeronauts, who abandoned their balloon. Lightened of their weight, it rose again and drifted towards the English Coast, which it reached at Hurstpierpoint, and caused no little excitement in view of the fact that the car was empty except for some provisions and three sea-soaked overcoats. The balloon collided with some telegraph wires and did some damage, but it was secured and then deflated.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 24th inst., when there were present:—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. H. C. L. Holden, C.B., R.A., F.R.S., Prof. A. K. Huntington, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Mervyn O'Gorman, and Harold E. Perrin, Secretary.

New Member.—The following new member was elected:—
Charles Parry Williams.

Aviators' Certificates.—The following aviators' certificates were granted:—

- 149. Lieut. A. F. A. Hooper (Bristol, Salisbury).
- 150. Lieut. H. A. Williamson, R.N. (Bristol, Salisbury).
- 151. Lieut. E. G. K. Cross (Bristol, Salisbury).

F.A.I. Conference.

The Conference will take place in Rome on November 25th. Among the many important subjects set down for discussion is the question of tests for aeroplanes. The suggestion, which emanates from the Aero Club de France, is that constructors should submit a pattern machine for certain tests as regards construction and flight capacity, and certificates will be issued in respect of that particular type after satisfactorily passing the tests laid down. The Committee of the Royal Aero Club is in favour of the proposal in principle, and the delegates attending the Conference will place the views of the Royal Aero Club before the Federation.

British Empire Michelin Cup, £500.

Intending competitors are again reminded that the above competition for this year closes on Tuesday next, 31st inst.

All attempts must be made between the hours of sunrise and sunset; the times for which are as follows:—

	Sunrise.	Sunset.
Saturday, October 28th ...	6.46 a.m. ...	4.42 p.m.
Sunday, " 29th ...	6.48 " ...	4.40 "
Monday, " 30th ...	6.50 " ...	4.38 "
Tuesday, " 31st ...	6.52 " ...	4.36 "

The minimum distance to be covered in order to qualify for this prize is 250 miles.

This prize can be competed for on any recognised flying ground.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

MODEL CLUBS.

Bath and Somerset Aero Club (11, ELM PLACE, BATH).

IN spite of the very treacherous weather, over 50 people were present at the flying meeting held under the auspices of the above club, on Saturday afternoon last, at Lansdown. Mr. W. Rowland Ding made some excellent flights with one of his Ding-Sayer models, and altogether some dozen models were brought to the meeting, amongst which some very fine flights were witnessed with models of Messrs. Smallcombe, C. Willcox and R. Cross.

The membership of the club is now rapidly increasing, and the hon. sec., Mr. S. H. Baker, will send full particulars to any who are interested and would like to join the club.

Blackheath Aero Club (5, LIMESFORD ROAD, NUNHEAD, S.E.).

VERY little flying took place last week-end owing to violent rain-storms, but in spite of this drawback Mr. A. B. Clark achieved a flight of 1,620 feet with a "duration" of 45 seconds. The wind during this flight was extremely strong and gusty, causing the model to "circle" a good deal.

The Committee wish to remind members of the "duration" competition which is to be held to-day (Saturday), weather permitting, on the Kidbrooke Ground, and a full attendance of members with their models is requested, and it is hoped they will make a good "fight" for the prizes offered. All competitors should be on the ground at 3 o'clock as flights in this event will commence at 3.45 p.m. prompt. Several new members have joined this week and full particulars will be posted to any model aeroplane enthusiasts who forward their names and addresses to the hon. secretary at the above address.

Conisborough and District Aeroplane Soc. (18, CHURCH ST.).

AT a meeting held in the club room on the 18th inst. it was

Entries must be sent to the Royal Aero Club, 166, Piccadilly, W., from whom full rules can be obtained.

The Brighton-Shoreham Aerodrome has deposited with the Royal Aero Club the sum of £50 to be awarded to the competitor who makes the longest flight (not being less than 250 miles) in the above competition at the Brighton-Shoreham Aerodrome.

Entries have been received from:—

- S. F. Cody (Cody biplane).
- D. G. Gilmour (Bristol monoplane).
- J. L. Longstaffe (Howard Wright biplane).
- R. C. Fenwick (Planes monoplane).
- Hubert Oxley (Blackburn monoplane).
- R. C. Kemp (Flanders monoplane).
- F. P. Raynham (Roe biplane).
- C. L. Pashley (Humber monoplane).

The Kite and Model Aeroplane Association.

The Committee of the Royal Aero Club has appointed the Kite and Model Aeroplane Association the authority to govern models in this country for the year 1912. The Royal Aero Club has also offered a prize of £5 5s. for competition under the auspices of the Kite and Model Aeroplane Association.

Late Hon. C. S. Rolls and Cecil S. Grace.

Mr. Alec Ogilvie has contributed £5 towards the stained-glass window now being erected in the church at Eastchurch.

Presentation to Library.

Mr. F. K. McClean has kindly presented "The Aeronautical Classics" to the library.

Membership of the Royal Aero Club.

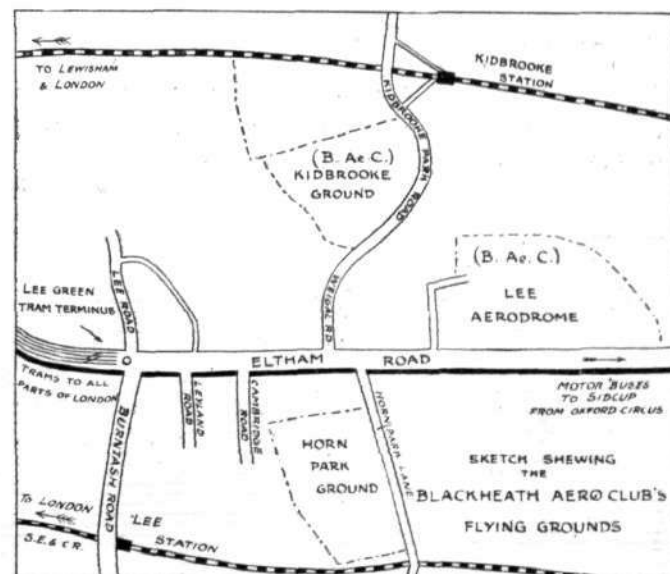
The membership of the Royal Aero Club is being added to each week, and a large number of new members have been elected during the year. The Committee, however, hopes that all members will use their best influence in extending the membership. The subscription of those members elected between now and the end of the year will cover the period ending December 31st, 1912.

HAROLD E. PERRIN,

Secretary.

166, Piccadilly.

decided to hold another model flying meeting on Nov. 4th at Conisborough, weather permitting. There will be four competitions for distance, duration, speed, and direction. The society is trying



to make this meeting the largest model flying meeting ever held in England. Fourteen models are already entered, and more are expected.

Kite and Model Aeroplane Assoc. (27, VICTORY RD., WIMBLEDON).

THE Royal Aero Club have appointed the Kite and Model Aeroplane Association as the authority to govern models in this country for the year 1912. Also the Royal Aero Club will present a prize of £5 5s. to be known as the "Royal Aero Club Prize" for competition under the auspices of the Kite and Model Aeroplane Association.

Manchester Model Ae.C. (40, BIGNOR STREET, CHEETHAM).

THE sixth weekly meeting was held at the Trafford aerodrome on Saturday last in a tricky wind. Some splendid flights were witnessed by a number of interested spectators. Afternoon's records were gained by Mr. Williamson with flights of 1,113 ft. and 51 secs. Mr. D. Wood was a good second, with flights of 1,107 ft. and 1,092 ft. Mr. W. H. Booth ("Redivalls," from whom several interesting letters have appeared in FLIGHT) had his patented stability plane in the air, and demonstrated its truly wonderful stability by launching it with its main plane vertical. The machine was on an even keel in less than five yards, and lost no height in the process. A meeting will be held to-day (Saturday) at the same place at 2.30 p.m. Enquirers please write to Mr. Kenmore Kinna at above address. Everybody is welcome to our weekly meetings.

Palmer's Green & District Model Ae.C. (15, MOFFAT RD., N.)

ANOTHER meeting of the above club was held last Saturday. Weather conditions were most unfavourable, and it was found necessary to postpone the steering competition on account of the strong and gusty wind. During the afternoon several models met with untimely ends. Mr. E. Brown was particularly unfortunate, and showed us that he has no luck where trees are concerned. Towards dusk the wind showed signs of abating, and some good flights were then made by Messrs. E. Marsh and R. Rogers.

Parkside Aero Club (2, EDBROOKE ROAD, PADDINGTON).

PROSPECTIVE members of the above club will have a very good return for their fee, which by the way is 1s. per month, as a workshop is provided and during the winter evenings here members will be able to work upon their models or the big machine, whichever they like.

Scottish Ae.S. (Model Aero Club) (6, McLELLAN ST., GOVAN).

OWING to the uncertain state of the weather there was no meeting of the club at Barrhead on Saturday. Nevertheless, there was plenty of good flying done by the members of the club. At Winton Drive, Messrs. Donaldson, Mills and Balden, also several non-members were experimenting, and many good flights were reported. At Renfrew, Messrs. Graham and Gordon gave a good show at the Public Park. Mr. Gordon started with two fine flights, one of them at a great altitude. He, however, had the misfortune to smash his fuselage at the third flight, the machine coming down in a side gust just after starting. Mr. Graham having two machines with him kindly lent Mr. Gordon one of them, so the flying was continued throughout the afternoon.

The inhabitants of the Royal Burgh have nearly all seen real aeroplanes, the course of the *Daily Mail* circuit having passed over Renfrew. The model flights on Saturday were, however, the first seen there, and the club has promised to go out to Renfrew in full force at an early date to give a further display. The secretary would be pleased to hear from anyone wishing to form a model club in any of the towns near Glasgow, and will give all assistance in doing so.

A meeting will be held at Barrhead Aerodrome to-day (Saturday), weather permitting, for some more attacks on the duration record.



Yorkshire Aero Club (HOTEL METROPOLE, LEEDS).

AT the recent Committee meeting the Chairman, Mr. Stuart A. Hirst, said the club were very proud of their flying members, including Mr. C. Grahame-White and Mr. S. F. Cody, who were honorary members, and Messrs. H. Oxley, B. C. Hucks, A. Hunter and Conway Jenkins. Arrangements were being made for public demonstrations to be given in Leeds by Mr. Hucks and others as soon as a suitable ground could be obtained. Mr. G. W. Blackburn was elected a vice-president in recognition of the practical help he had given to the cause of flying and the construction of aeroplanes in the county.

It was decided to invite the members of the Leeds Model Aeroplane Club to become Associates of the Yorks. Ae.C., and to allow them the use of the model aeroplane flying ground, while prizes will be offered for a local model competition. Members of the model club will also be invited to the Yorks. Ae.C. lectures during the winter session.

A Model Club for Beckenham.

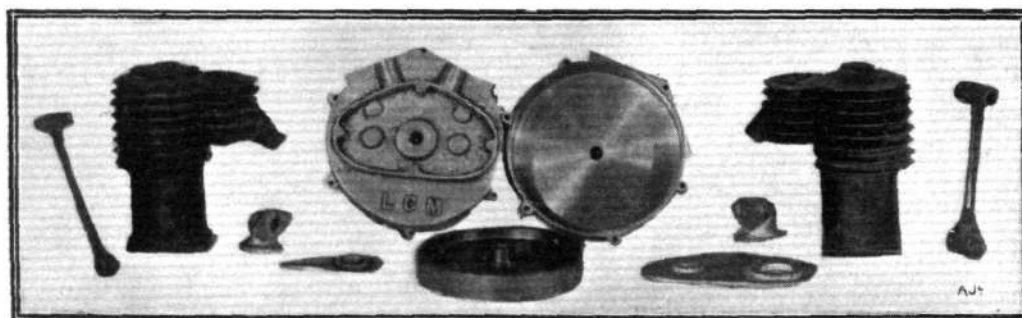
A NUMBER of model makers in the district of Beckenham are organizing a small club, and all who are interested in the project are asked to communicate with Mr. Roland T. Goodchild, 52, Kent House Road, Beckenham, Kent, in order that a meeting may be called to formally start the club.

Bristol Model Flying.

A MODEL aeroplane meeting was held on the Downs on Saturday week, when about 20 models appeared. As 15 were of the same type (1-1-P.), it was decided to postpone the competition until the larger machines were ready. Smallcombe models were very much in evidence, and although they have an aspect-ratio of 12 to 1 and are about 15 ins. long, they flew distances of from 800-900 ft. several times, and their record is over 1,000 ft. A Vesey (similar to Givaudon) double monoplane flew well, but this has a knack of turning round and round on its axis. The large models were not tuned up, but flew a few hundred feet. An interested audience watched proceedings, including an intelligent dog, who was helpful in pursuing a wandering Smallcombe, although doubts as to his strict integrity arose when he carried it off to an onlooker. The next meeting will be in a few weeks' time.

Model Aeroplanes at West Hartlepool.

THE second of a series of flying competitions was held on Saturday afternoon, October 14th, in connection with experiments being carried out with model aeroplanes by the Technical College Experimental Engineering Society, when most interesting results were obtained. The spectators were greatly delighted by the flying capabilities of Mr. Jenner's monoplane, which was designed and constructed by himself. This machine carried out its flights most gracefully in a straight line, eventually carrying off first prize in both events, namely, duration and distance. His two best efforts were for duration, 19½ secs., and for distance, 540 ft. The model belonging to Mr. C. Armitage obtained second prize for duration. This model excelled at altitude work and travelling strong against the wind, but was not so successful in keeping a straight course, being inclined to go in a circle. Its best time was 15½ secs. Mr. E. Donkin's model was of interest from the fact that it was the largest in the competition, and its flying being steady and straight; the members were pleased when he carried off second prize for distance, his model having flown 355½ ft., when it was brought up by striking a fence. All the models in the competition were made by the competitors, the workmanship being remarkably good. Throughout the afternoon Mr. J. Angles, M.Sc. (hon. president), ably acted as judge.



LIVONIA CASTINGS.—Photograph of a set of engine castings, partly in the rough, made for model aeroplanes by the Livonia Components Manufacturing Co., of 66, Elgar Street, Longsight, Manchester. The bore of the cylinders in the rough is 28 mm.

"Aerodrome to Aerodrome" Maps.

A NEW series of maps for aviators is now being prepared by Mr. E. H. Clift. These are to show the country lying between the various flying grounds, in order to enable flyers to make trips from aerodrome to aerodrome. Mr. Clift would be glad if those who have a knowledge of the various prominent landmarks on the different routes would write to him, and we understand he will be pleased to present sections of the map to those aviators who render him practical help in this way.

AIR EDDIES.

THE firm of Armand Deperdussin has, since its advent into the arena of aeroplane construction at the last Paris Salon, characterized its doings by a vigour which scarcely has been equalled and certainly not excelled. The latest addition to their staff of pilots, amongst which is numbered such men as Prévost and Vidart, is the celebrated Jules Védrines, who attained fame by his marvellous flying on the Borel-Morane monoplane.

Thus the Borel firm have suffered another loss, for it was only quite recently that Morane dissociated himself from the combination together with Saulnier, who is directly responsible for the design of the Borel-Morane monoplane.

However, it is likely that the business of the Maison Borel will not suffer to any appreciable extent, for they are still continuing to construct at their works at Meudon the Borel-Morane monoplane of the type that was chiefly popularized by its performances in the Circuits of Europe and Britain. Besides, they have such first-class men as Frey and Tabuteau amongst their pilots, so what need they fear?

It is really not curious that things which have travelled by aeroplane bear an enhanced value. Take, for instance, the aviators themselves—"things" was perhaps the wrong word to have used—they are undoubtedly regarded as something out of the ordinary, especially by members of the fair sex. Newspapers, letters and post-cards have all been subjected to similar treatment, and their respective intrinsic values have been increased thereby. For this reason it seems as though the aeroplane will form a very valuable advertising agent until that fond day when aeroplanes will be as numerous as are motor cars to-day. The latest "stunt" in this respect is the delivery of boots from Northampton to London by aeroplane. Moorhouse, who undertook to carry out the service, made his first delivery on Thursday of last week, when, despite a thick fog and a high wind, he flew to Hendon with a load of twelve pairs.

One of the Avro biplanes at Brooklands has been got ready for an attack on the British Michelin duration prize, and, with Raynham at the lever, should make a good showing.

In order to protect the pilot against cold, the cockpit has been covered in in such a manner that only the upper half of his head emerges from the fuselage, and undoubtedly this covering will do much to diminish head resistance. The machine has been tuned to carry 24 gallons of petrol, enough to last for over six hours.

Another contestant for the same record is C. L. Pashley on the Humber monoplane with Humber 4-cylinder engine. Since the brothers Pashley have acquired its ownership, both machine and engine have been giving good accounts of themselves. Hunter, of the Goupy and Avro biplane, was mainly responsible for the tuning of the engine, and now so well is it running that Pashley finds no difficulty in rising to 500 ft. in one circuit.

Capt. Guy Livingston, C. Compton Paterson, and E. F. Driver have joined forces to form a company—The African Aviation Syndicate, Ltd.—for the purpose of exploiting aviation in South Africa; and, considering the undoubted merits of the prime movers, —Livingston as a business man, Paterson as constructor-pilot, and Driver as pilot—their success is almost assured. The former sailed for Cape Town on the 26th of this month, at which place he will make arrangements for the first series of exhibitions. Paterson, who has designs on a particularly noteworthy flight, in which Table Mountain will play an important part, will follow, together with Driver, on the 11th of next month.

They will take with them a new biplane, which Paterson has been constructing at the motor body works of Messrs. Lawton, Cricklewood, and a Gnome-Blériot of the latest type. The latter machine is one already too well known to our readers to need description, and as for the former I am reserving the description until next week, when it will be dealt with in detail. Sufficient for the moment to say, that, although light and handy, it is about as strong as anything yet seen in biplanes, especially as regards wing construction. For my edification, Compton Paterson walked about inside the *cellule* to demonstrate this latter feature.

The business programme of the Syndicate does not consist exclusively of catering for flight exhibitions, for they intend to form a school and establish works. In addition they have obtained the sole agencies for the Colony of Blériot monoplanes, Chauvière propellers, and a noted make of automobile.

The Chanter monoplane on Nieuport lines at Hendon is gradually nearing completion, and is being fitted with a 35-h.p. Anzani engine of the latest type. As Chanter is shortly proposing to transfer his headquarters to the Shoreham aerodrome, it is unlikely that the machine will be flown until he has settled down in his new home.

That E. V. B. Fisher is making good progress towards recovery from the bad fall he experienced at Brooklands a fortnight or so ago will be welcome news to his many friends. As his memory has not at all suffered, it seems that the extent of his injuries is a very severe shock, and in this case it should not be long before he will be able to take up flying again.

That the Blackburn monoplane, which Hucks has been flying on his extended exhibition flight tour in the West country, has, with the exception of one broken propeller and a damaged wing-tip, suffered no damage whatever, is surely a fine tribute to the soundness of its general construction, and particularly that of the landing gear. Moreover, it must be remembered that his flights were not made from prepared aerodrome surfaces, but in some cases from the sort of ground that, in France, has been selected to test the landing qualities of the contestants in the official military tests.

As for the machine, it is in as good condition as the day it left the works, save for its travel-stained and signature-covered appearance.

I hear that one of our best-known constructors has vacancies for an apprentice, and also a premium pupil, the latter to receive practical instruction in the higher branches of the science from the principal of the firm. As this is quite an unique opening, any applications addressed "Tuition," care of FLIGHT offices, will be put forward in the right quarter.

The Bristol school at Brooklands is steadily on the increase, chiefly owing to the energies of Fleming and Pizey, both of whom are not merely first-class aviators, but first-class business men as well.

With the interests of their school so much at heart, they certainly seem like succeeding in their aim to make the school unsurpassed for sound organization.

One of the directors of a noted firm supplying lubricants, who has a particularly heavy correspondence to deal with, has invented a machine with which he can append eighteen signatures to as many letters at one operation. Think of the time and trouble that would be saved by many of our aviator heroes in complying with requests for autographs by the use of such a contrivance.

"OISEAU BLEU."



Tight-Rope Launching for Aeroplanes.

WITH the object of demonstrating that special platforms are unnecessary for the launching of aeroplanes from battleships, which he considers may be safely performed by running along a wire, Lieut. T. G. Ellyson has been carrying out some important experiments at the Hammondsport training grounds of the Curtiss factory in America. A cable was stretched from a platform 150 ft. high down to the surface of the water, and the hydro-aeroplane slid along

this wire by means of its flat-bottomed box, which does hydroplane duty. The machine is maintained in balance on the main cable by two auxiliary wires on either side. As the aeroplane is designed for alighting on water, and tests have already been made which proved that such a machine can be successfully hoisted on board, the satisfactory conclusion of the present series of experiments should go a long way to remove the principal obstruction in the way of the use of flying machines in connection with battleships.

FLIGHT PRIZES FOR MODELS.

It is impossible to feel other than somewhat disappointed at the immediate result of the little scheme we started some time ago for the purpose of encouraging model research. Within, figuratively speaking, a few hours of our announcement, we were inundated with a flood of letters trying to get the first prize. It was just the same, we remember, in the case of our Speed Alarm Competition. Long before anyone could possibly have had an opportunity of considering the problem, solutions began to pour in, with the result, as was only to be expected, that several competitors showed very clearly that they had not even read our announcement properly.

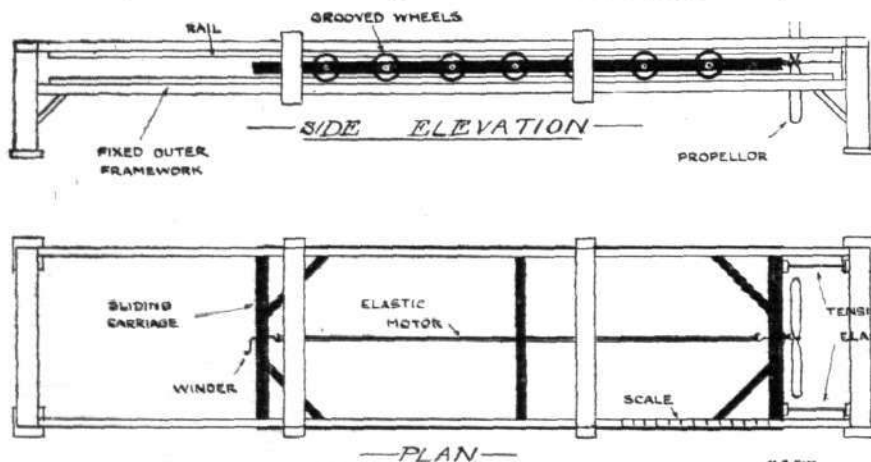
In the case of our model prize scheme, we have most effectively checked this literary exuberance by temporarily withholding publication of the few contributions that are worth publishing at all. Out of all those sent in we have selected four that are reasonably in accord with the basic idea underlying our offer. What we want to do is to encourage young students of flight to think for themselves and to learn the art of expressing their thoughts in a manner that is intelligible to others. For this reason we have made the essential and governing conditions in our competition one that makes it imperative to the competitor to state very clearly the problem that he has sought to solve and to explain with equal lucidity his method of attacking it, the results obtained, and the deductions that he makes therefrom.

These things are not easy of accomplishment, but they are worth acquiring. It is a mistake to suppose that they have nothing to do with the subject of flight; the student who learns to see simple facts clearly, and give expression to his views with ease and lucidity, will evolve as a master who is worthy and competent to teach others. It is not to be expected that model research of the kind that we are attempting to encourage will immediately result in any wonderful discovery and it is the greatest sort of mistake that any student can make to prosecute an experimental study of this kind with the idea of finding out something that no one else knows. His object should be to learn by convincing himself of facts, and he can only do this by formulating for himself a question, and constructing an answer out of actual data. Playing with models is only the first step; it is the step that ought to inspire the mind to ask a question. Then the playtime ceases, and the listless winding of the rubber motors is at an end. Every act has now a definite purpose, each adjustment is made with but one end in view; a new joy fills the heart of the experimenter. That is the spirit in which we should like to see models viewed by the rising generation, and that is the spirit in which we have offered our simple prizes, the first of which we award this week.

A Propeller Thrust Testing Apparatus.

FROM a spring balance suspend two pieces of thin elastic of known length. Stretch these strips until the hand of the balance reaches the half-ounce mark, and draw on paper a line equal to the stretch of the elastic. Continue stretching the elastic and take note of the increased length of it for the weights added.

A rectangular frame is made, the sides, which should be of some hard wood, have sockets cut out at regular intervals. Small pieces



Malcolm B. Ross.

of wire passing from side to side of these sockets serve as axles for grooved wheels, which, running on strips of bevelled metal, inserted in a fixed wooden framework, enables the inner framework which carries the motor and propeller, to run almost frictionlessly. The pieces of elastic which were hung on the balance are now fastened to one end of the sliding frame and to the same end of the outer fixed framework. Another scale, corresponding to the one made of

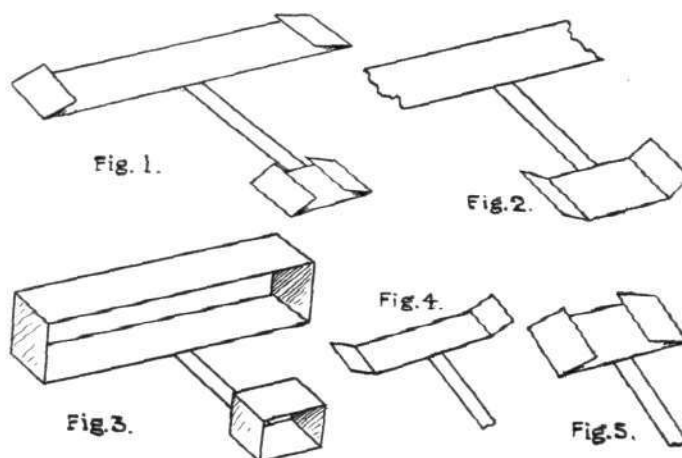
the stretching of the elastic can be marked out on the outer framework—zero being indicated at the end of the sliding frame, when the elastic connections are perfectly straight.

By winding the motor a definite number of times the thrusts of propellers can be known and compared from the results registered on the measure, due to the sliding frame being pushed forward by the thrust of the propeller in use.

MALCOLM B. ROSS, 15, Highgate Avenue, Highgate, N.

To Discover the best flying type of Glider with main Planes and Elevator.

I MADE a paper glider similar to Fig. 1 and found that it glided fairly well. I then turned the side tips of the elevator outwards as in Fig. 2, keeping the main plane the same as at first; but I found



C. H. Higgins.

that it did not glide nearly so well. Then I turned the side tips of main plane outwards, making them similar to those of the elevator; the glider flew better than in the previous case, but not so well as in the first case.

Following this I constructed one similar to Fig. 3 (a biplane), having the elevator and main planes of the same type, and it flew comparatively well. Again I altered the form of the elevator into numerous shapes, including those of Figs. 4 and 5. But I found after all that the fundamental type in Fig. 3 possessed the best gliding facilities.

From these experiments I was in a position to draw the following conclusion: that to get the best gliding capacity the elevator and the main plane (or planes) of a glider must be of the same type. Because the elevator and the main planes each trace a certain path in the air, and to obtain the maximum quality and quantity of flight, the two members must trace paths in the air which are in harmony and not in discord.

C. H. HIGGINS, 7, Holland Road, Westcliff-on-Sea.

To investigate the effect of various aspect ratios upon an aeroplane with regard to—1. Its gliding angle. 2. Its stability. 3. Its speed—by means of paper gliders.

Upon a consideration of the various aspect ratios of the existing practical aeroplanes—which range from approximately 2 on the Demoiselle to 9 on the Roe triplane, one is surprised that there is no definite aspect ratio which may be considered as the most efficient.

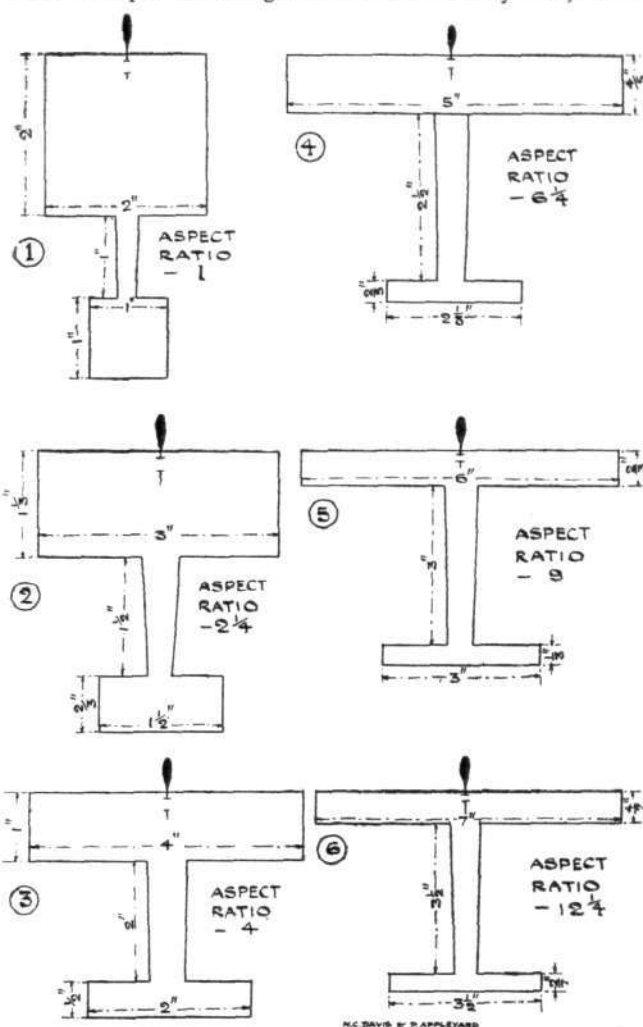
The average constructor seems to disregard any efficiency he might obtain from aspect ratio for considerations which are sometimes more important. If these considerations are eliminated what effect has aspect ratio upon the general behaviour of an aeroplane, and is the efficiency to be gained by a good aspect ratio worthy of more consideration than it at present gets? In the following series of experiments

with paper gliders as many disturbing factors as possible have been so removed that the changes observed in the various gliders can be almost entirely attributed to their different aspect ratios.

Six gliders were used, of the Blériot type. The chord and span of the tail were made half the size of the main planes, and the aspect ratio of the tail varied with the main planes. The area of the tail and the main plane remained constant in all six gliders. The

gliders were made of stiff drawing paper with some plasticine on the end of a pin in the main planes for a weight.

The plasticine in front was made into streamline formation, and the planes were cambered. The actual area of all the main planes was 4 sq. ins. and of the tails 1 sq. in. For the sake of convenience the span of each glider was increased by 1 in., the first



Messrs. Davis and Appleyard.

having a span of 2 ins. The chord was then calculated so as to give the requisite area, and then the aspect ratio was found. Appended is a table giving the actual results obtained. The aspect ratios varied from 1 to 12, and the general trend of the results seemed to show that—

1. As the aspect ratio got larger the gliding angle steadily improved. The first glider, which had an aspect ratio of 1, had a gliding angle of 1 in 2, while the sixth one, with an aspect ratio of 12.25, had a gliding angle of 1 in 5.3.

2. With increase aspect ratio stability improved both laterally and longitudinally. The lateral stability improved markedly.

3. As the aspect ratio increased the speed increased.

4. The three gliders with the highest aspect ratios required more weight.

5. Glider No. 2 had approximately the same aspect ratio as the Demoiselle; the third, with an aspect ratio of 4, corresponded to the Blériot single seater; the fourth corresponded in aspect ratio (6.25) to the Antoinette; while the fifth, with its aspect ratio of 9, corresponded to the Roe triplane.

Table of Results.

No.	Aspect ratio.	Stability.	Gliding angle.	Speed.
1	1	Long.: good Lat.: bad (rocked) ...	1 in 2	Slow
2	2.3	Long.: good Lat.: not very good	1 in 3.5	Fairly fast
3	4	Long.: good Lat.: not very good	1 in 4.1	Slow
4	6.25	Long.: good Lat.: good ...	1 in 5	Fast
5	9	Long.: good Lat.: good ...	1 in 4.8	Fast
6	12.25	Long.: good Lat.: good ...	1 in 5.3	Fast

Messrs. DAVIS AND APPLEYARD, Nelson Villa,
Sunnyside Road, Worcester.

The Influence of Curved Wing Tips on Lateral Stability.

THE following series of experiments were carried out with a view to discovering some form of wing tip which could readily be applied to an ordinary rectangular plane and which would impart to that plane a certain degree of automatic lateral stability.

To do this a number of gliders were made, each embodying a particular design of wing tip curvature, and were subjected to sudden gusts, steady side winds, &c., their behaviour in each being carefully noted.

The material used for the gliders was stiff cartridge paper, weighted with plasticine. Only the extremities of the main planes were curved, and the planes were cambered. In all cases the Blériot type of machine was used.

The various types experimented with, their behaviour under various conditions, and in some cases the probable theoretical actions are set out below.

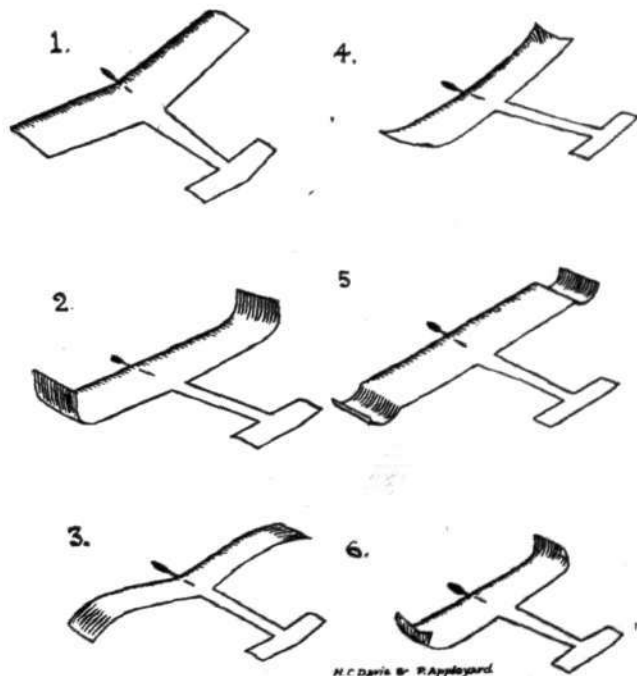
Glider No. 1.—To form a basis for the results a simple glider without any curved wing tip, but having a slight dihedral angle, was made and tested. In a steady side wind the model rocked considerably, and showed a tendency to turn away from the wind. It was very slow in regaining an even keel after a gust had struck it (see drawing 1).

2. The second type had the tips curved upwards almost at right angles to the main planes (Fig. 2), somewhat as on the Werner monoplane. This type rolled slightly in gusts, and also in a steady wind, but regained an even keel much more quickly than the simple form of model (i.e., Fig. 1).

3. This glider embodied one of the most stable forms experimented with. It had a dihedral angle and the wing tips curving downwards (Fig. 3). When subjected to a cross wind the model drifted bodily sideways on an even keel, and only rocked slightly even in quite violent gusts. When held by one wing tip and then dropped, it recovered itself quite quickly. This principle is apparently employed in the Sanders biplane.

4. The next one tried had the wing tips bent to the shape shown in Fig. 4. It seemed extremely stable in side winds, and its behaviour appeared rather remarkable. When struck by a side gust the model heeled over towards the wind owing to the pressure on what is practically an inverted camber. The opposite wing was deterred from rising by the dragging action of the tip, which probably acted somewhat in the capacity of a parachute. The result was that the model dropped bodily a small distance but immediately regained its lateral stability.

5. The behaviour of this model, which had the wing tips curved as in Fig. 5, was unique in that, when struck by a side wind, it pitched bodily instead of the usual rolling. It seemed to recover an



Messrs. Davis and Appleyard.

even keel, after this pitching, rather quickly. On the whole the model seemed rather erratic, and its behaviour was distinctly puzzling.

6. The type of wing tip embodied in this glider (Fig. 6) seemed very efficient. In side gusts it rolled slightly, but recovered itself very quickly. In a light side wind it proved quite stable. Altogether it seemed a distinct improvement on No. 1.

A number of models which were experimented with exhibited less lateral stability than the simple form of model No. 1. Descriptions of these have been omitted as superfluous. Several other gliders were discarded, although some seemed stable, as being impracticable owing to the constructional difficulties which would occur on a full-size machine.

Of all the gliders experimented with, types 2, 3, and 4 proved themselves the most efficient. The dropping wing tip of No. 3, forming a sideways camber of the whole of one wing, certainly imparts a great degree of automatic lateral stability, and should be worthy of trial on a power-driven model, and then on a full-size

machine. No. 4 has a drawback in that at a certain angle the effect of the lower tip overcomes the drag of the upper owing to the downward movement of the whole machine, and the model turns completely over. The angle at which this happens, however, is sufficiently steep to be practically unattainable in flight. Each of these models proved themselves far superior in lateral stability to the simple model, and one hopes that in this branch of aeronautics the great opponent of efficiency—constructional necessities—may not be too powerful.

MESSRS. H. C. DAVIS and P. APPLEYARD,
Nelson Villa, Sunnyside Road, Worcester.

HOW TO BUILD A MODEL.

By W. BOOTH.

It is about eighteen months ago since I caught the fever. It was a stray copy of FLIGHT that did it, and FLIGHT has been my guide, philosopher and friend from that day to this.

I well remember my first flyer. It was a rough scale model of a Farman machine. I took the idea from an illustration, and wonderful to relate the thing flew at the first try.

It was a main-plane-first affair, with a 9-in. tractor. It made circular flights and broke its main-plane spar with the most exasperating regularity. It was a case of 2 mins. fly, and then 2 hours in the repair shop; which in time became monotonous. Want of stability, both lateral and longitudinal, was the great fault of No. 1, otherwise it was a nice-looking model.

My second, third, fourth and fifth machines were Blériots fitted with twin tractors. I made endless experiments and gained much experience, but I never got a flight of more than 20 ft. But at this stage it suddenly dawned upon me that toyshop models travelled "tail first" and that propellers were more in vogue than tractors.

My sixth, seventh and present flyers were built to this new idea, and although I am not a long-distance man as yet, my *forte* being stability rather than the mere multiplication of yards, I can get my 36 in. by 29 in. model to do its 300 ft. without unduly straining its elastic muscles.

No one can build nine model aeroplanes without learning something. Actually I have seen only one other model fly. Such knowledge as I possess is, therefore, first hand and very much based on practice. Often I am asked why so many model flyers are so unlike actual machines. My reply is that the conditions are so different.

In a model the weight of the motor is necessarily distributed over the whole length of the machine; in the real

flyer this weight can be concentrated within a square yard or so. Also the fact that, in a model, control must be either natural or automatic, means that the design must be very different.

In successful model-building there are many things to be considered: general design; planes; area and proportion; propellers; elastic, tension and amount; control; and constructional details. All these points are interdependent, and success depends on their careful correlation.

Come with me to my workshop and we will rebuild my latest flyer. My tools, as you see, are few. A little tenon saw, a tiny iron plane, a 2-ft. rule, a drill, some screws, and a sharp penknife complete my outfit. I have already decided that it shall be a monoplane; you have no voice in that.

Secondly, I am determined that it shall fly tail-first.

Thirdly, that it shall be pushed through the air by propellers, and not pulled along by tractors. Fourth, that it shall have twin screws, and lastly that its lateral balance, at any rate, shall be automatic.

And now we will make a start on the design. How big shall it be? What length? What size planes? How much elastic? How can we be sure it will fly when completed? These are fair questions. It has taken me twelve months to work out the answers.

In the first place, I have evolved an axiom or two that have proved useful.

(a) For every ounce of weight allow not less than 35 sq. ins. or more than 50 sq. ins. of plane area. Too much slows the flight.

(b) For every 3 ozs. of weight allow not less than 1 oz. of elastic.

(c) Allow two 10-in. propellers with $\frac{3}{4}$ oz. each of elastic to a 4 oz. model; or two 12-in. propellers with $1\frac{1}{2}$ oz. each of elastic to an 8 oz. model.

(d) Rigidity and strength are more important than mere lightness.

Experience shows also that too small a model is a mistake, and one too big a blunder. We will, therefore, adopt the happy medium and make ours 36 ins. long, and as longitudinal stability is increased when the length is greater than the width, we will make it 29 ins. wide.

A model this size, if carefully made, is capable of a lengthy flight and will weigh, complete, from $7\frac{1}{2}$ to 8 ozs.

This weight is made up as follows:—Frame, $2\frac{1}{2}$ ozs.; elastic, $2\frac{3}{4}$ ozs.; main-plane (silk covered), 1 oz.; two 12-in. propellers, with bearings, 1 oz.; elevating plane, stability fins and skid, $\frac{3}{4}$ oz.

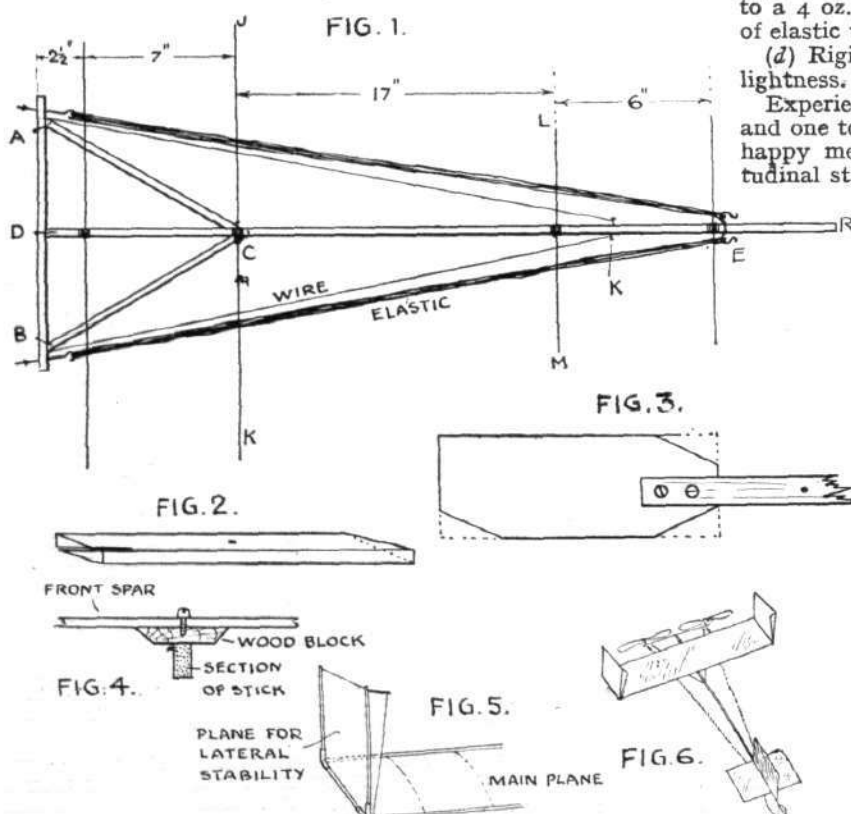
Applying axiom (a), i.e., 35 sq. ins. to the ounce, we get an advisable plane-area of 280 sq. ins.

Having thus arrived at size of model, weight and necessary plane area, we can go on to the question of construction.

First, I take a straight-grained flawless piece of spruce or pine, and plane it down until it measures $\frac{1}{2}$ in. by $\frac{1}{4}$ in. Then I cut off one spar 36 ins. long, two 11 ins. in length, and another 13 ins. in length, and join these pieces together into a frame (Fig. 1).

Six ins. from the end, R, a stout wire pierces the main stick. This is bent to hold the looped elastic.

Next, take two strong thin wires, and, first seeing that the frame is quite true and square, stretch them tautly from A and B to the point, K, 9 ins. from R. Then bore holes in the cross



bar at A and B, $\frac{1}{2}$ in. from each end, for the propeller bearings, and the frame is finished.

Propellers may either be bought or made. I make mine by planing a piece of light wood down to $\frac{1}{16}$ in. in thickness and cut from it two pieces each $4\frac{1}{2}$ ins. by 2 ins.; then shape them to Fig. 2. Then I cut a strip of wood 6 ins. by $\frac{1}{2}$ in. by $\frac{1}{2}$ in. (Fig. 3), and after boring a hole for the propeller-shaft, I make a diagonal saw-cut at each end $1\frac{1}{2}$ ins. deep, and secure the blades in the slots with two small screws and a touch of glue.

As to the elastic, the distance between the propeller hooks and the hook on the forward end of the stick should be 30 ins., and we want twenty-four strands of elastic to each propeller. Elastic should be so put on that it is in a state of moderate tension. This question of tension, however, is a stumbling block to many, as elastic is often put on too slack, and no power is obtained. It is a good rule to stretch the elastic to twice its normal length.

So for each propeller we will allow fourteen complete 15-in. loops of $\frac{1}{16}$ in. elastic, making in all twenty-eight strands to each propeller. This means 12 yds. of elastic to each propeller. A little more will do no harm.

The chassis is now complete, and the problem of the planes next presents itself. Lengthy experiments have shown that a proportion of roughly 3 : 1 between main plane and elevator is a good one to observe, so a little calculation gives us a main-plane area of 203 sq. ins., or 29 ins. by 7 ins., and an elevating plane of 78 sq. ins. or 13 ins. by 6 ins.

Most model-builders have their own ideas as to the manufacture of planes. Mine are made of $\frac{1}{8}$ in. by $\frac{1}{8}$ in. wood, joined at the corners by three-way magnalium tubes. These tubes are so arranged that in the main-plane the upright tubes point upwards. The use of these will be apparent later.

My planes are slightly cambered, not more than $\frac{1}{4}$ in. rise at the outside, and they are covered with proofed silk.

Having made the planes, their relative positions are very important, as the flying capacity of the machine will depend entirely on this point.

The back edge of the main-plane should be $2\frac{1}{2}$ ins. from the front of the cross bar, A, D, B, Fig. 1, and the distance between J, K, and L, M, Fig. 1, should be 17 ins.

To raise the planes clear of the elastic it will be necessary to glue $\frac{1}{4}$ in. blocks to the top edge of the stick to which to fasten the respective planes. These should be shaped as Fig. 4 to give a wider base of support for the plane spars.

The block under the entering edge of the elevating plane should be $\frac{3}{8}$ in. thick, so as to give a slight angle of inclination.

In fact, the final adjustment of the model is made by means of this block. If on trial the model rises or falls (test with some forty or fifty turns on the propellers) this block should be thickened or thinned until the adjustment is satisfactory.

A thin screw through this plane-spar will afford an easy means of attachment and adjustment.

In case of any great error in proportional weight having been made, a sliding weight, $\frac{1}{4}$ oz. or $\frac{1}{2}$ oz., along the main stick will often provide a remedy.

The question of lateral stability is most interesting, and the following solution is the subject of Patent No. 26720, but this article constitutes a permit to any reader of FLIGHT to manufacture a model on this principle, for his own use.

Take four pieces of $\frac{1}{8}$ in. by $\frac{1}{8}$ in. wood, each 6 ins. long, and place them like little masts in the upright tubes of the angle-pieces of the main-plane, as in Fig. 5.

At the top of the one at the entering edge of the main-plane fix a piece of thin wood 2 ins. long, projecting at right angles. Then turn these upright pieces until their projecting bars are at angles of 30° and pointing inwards.

Now cover the frames thus made, with silk or paper, as in Fig. 6, and lastly make a light plane 5 ins. by 7 ins. for a rudder or entering fin. Now fix a light cane skid as shown in the sketch and the flyer is complete.

It will fly and will fly straight. It will alight without damaging itself and it automatically recovers itself from any angle.

What more could you want?

✕ ✕ ✕ ✕ SCHOOL AERO CLUB NOTES.

By ROBERT P. GRIMMER, General Secretary, British Federation of School Aero Clubs.

ONE of the great ends of our Federation is to inculcate some knowledge of aviation into the mind of the "man-in-the-street." The utter ignorance of the general public in all matters appertaining to aviation is really appalling, and this was never so forcibly brought home to me as during my recent model aeroplane demonstrations at Felixstowe. Below I give a series of *bonâ fide* questions which were actually put to me by obviously educated and well-bred people. (1) Does it matter which way (forward or backward) the machine flies? (2) Do you keep one propeller and motor in reserve so that they can start when the first have stopped? (3) Does the machine fly straight up like a balloon? (4) What oil (!) do you use for your rubber motor? (5) Is rubber much employed as a motive power on full-sized machines? (6) Is this (indicating the winder) your launching machine? (7) Will this monoplane (a four-ouncer) carry a passenger? (8) This is an airship, isn't it? (9) Monoplanes will fly upside down, won't they? (10) Wouldn't you find a shilling steam-engine a more suitable power plant than rubber? (11) How fast do your wings flap? (12) Can't you really make her go against this (approximately 40 m.p.h.) wind? Incredible though it may seem, several of these questions were asked by men of engineering and scientific attainments. This being so, it would seem that a more general indulgence in the sport of model flying by our younger generation would not be without its effect on their parents and friends, more especially as it is impossible to achieve any success with a model without some knowledge of the main principles of flight.

I am sorry to say that in several schools the aero clubs have been recently suppressed by the authorities, the members being given in two cases the alternatives of resignation or expulsion. The reason assigned for this drastic and illiberal action was the fear lest some of the members should ultimately take up the profession of aviation, and consequently—so it was said—meet with a certain and painful death! Each worthy and learned headmaster stated that the responsibility resting upon him was too terrible, as he felt certain that model-making would culminate in the real thing, with the sad results mentioned above. The work of the Federation has always been severely hampered by the prejudices and conservatism of the benighted school authorities of this country. In the average English school no embargo is placed upon any reasonable means of recreation, and one may find everywhere devotees of boxing, fencing, fishing,

butterfly-collection, and a score of other things, but in the great majority of schools aviation has up to the present been classed with betting and gambling as things forbidden. From the outset the Federation has had to contend against a considerable amount of opposition on the part of school authorities, and its work has been greatly hampered by the absurd prejudices of those whose acquaintance with the subject is confined to Ovid's version, in the original Latin, of the flights of Dædalus and Icarus. It is interesting to contrast this attitude with that of several Canadian School Boards, which have actually adopted aero model making as a school handicraft. It is a fact that a single School Board in Canada recently placed with an English firm an order for accessories to construct 250 aero models of the twin-screw type. I wonder if the time will ever come when an English School Board will go and do likewise. And in the meantime, while our older generation is supremely indifferent, and our younger generation sternly suppressed, the foreigner is gaining bit by bit the experience and data which are going to assure for him in the near future the empire of the air.



Mr. Archie Allan in his flight costume with which he secured first prize at Tynemouth Palace Skating Carnival. It represents a Blériot C.C. monoplane (one-sixth full size).

BRITISH NOTES OF THE WEEK.

Mr. Pixton Flies from Amesbury to Hayling Island.

ON Saturday week last Mr. Pixton made a trip on a Bristol biplane to Hayling Island, mainly with the object of making some flights over the sea. Starting from Amesbury at 2 p.m., with Lieut. Burney, R.N., as passenger, they arrived at Hayling Island at 5 o'clock, having stopped at Durley, near Eastleigh, for lunch. In addition to the stop for lunch, the aviators were handicapped so far as speed was concerned by a very strong head wind, which they had to battle with. When nearing the sea, the gustiness of the wind considerably moderated, and the change to a steady current was particularly helpful. After Mr. Pixton's arrival the weather remained so persistently gusty that he was only able to fly on three occasions, the wind going steadily from bad to worse. During all this time the machine was simply tied down on the shore, surrounded by a few bathing machines, as seen in our photograph, a fact which speaks volumes for the high-class workmanship put into the Bristol machines by the constructors.

The New Paterson Biplane Makes its Début.

ON Wednesday of last week Compton Paterson tested his new biplane in a field near the Welsh Harp. It rose after a run of 20 yds., and seeing that the balance was perfect Paterson decided, without descending, to take the machine for a trip across country. This, however, was prevented by the petrol-supply pipe becoming choked, which, as he had then attained little height, let him down *en pancake* on the top of a hedge. Beyond carrying away the landing-chassis and bending the elevator, no damage was done to the machine; and it says something for the strength of the wing construction that, although the machine pulled up on its lower plane, only three ribs went. The machine is again ready for test, and, as he knows the balance to be perfect, Paterson intends flying it straight to Brooklands.

Mr. Hucks' Exhibition Tour.

DURING his three months' tour, which started on August Bank Holiday, Mr. Hucks has visited Taunton, Burnham, Minehead, Western-super-Mare, Cardiff, Newport, Cheltenham and Gloucester, and, notwithstanding the varying state of the weather, upon only two days of the thirty advertised for flying was it found to be too bad to get up, and this in spite of the general unsuitability of the ground from which Mr. Hucks had to start. Altogether about 90 separate flights were made, covering an estimated distance of 1,000 miles. The Gnome engine ran throughout, without as much as a misfire, with the exception of a stop 1,000 ft. up at Cheltenham through want of petrol, owing to the oversight of a mechanic. A fair amount of cross-country work was also put in during the tour, as four of the towns visited were reached by way of the air, beside several point-to-point jaunts and three trips across the Bristol Channel. The tour amply demonstrated the general excellence of the Blackburn monoplane as a machine to really stand hard wear,

while the whole performance reflects great credit upon Mr. Hucks as an aviator.

The Ferguson Monoplane.

MR. HARRY FERGUSON has now transferred his reconstructed monoplane to the shore of Strangford Lough, a short distance below Newtownards. During some trial flights on the 17th inst. the machine behaved splendidly, and Mr. Ferguson was able to take up several passengers, including a lady.

The Wrecked Naval Airship Inquiry.

THE work of the Committee of Inquiry as to the cause of the disaster to the Naval airship was concluded on Wednesday of last week, and the Committee will draw up a confidential report for submission to the Admiralty. It is impossible to get any idea as to the nature of the report, but there is a most persistent rumour at Barrow that another airship is to be built.

Boots by Aeroplane.

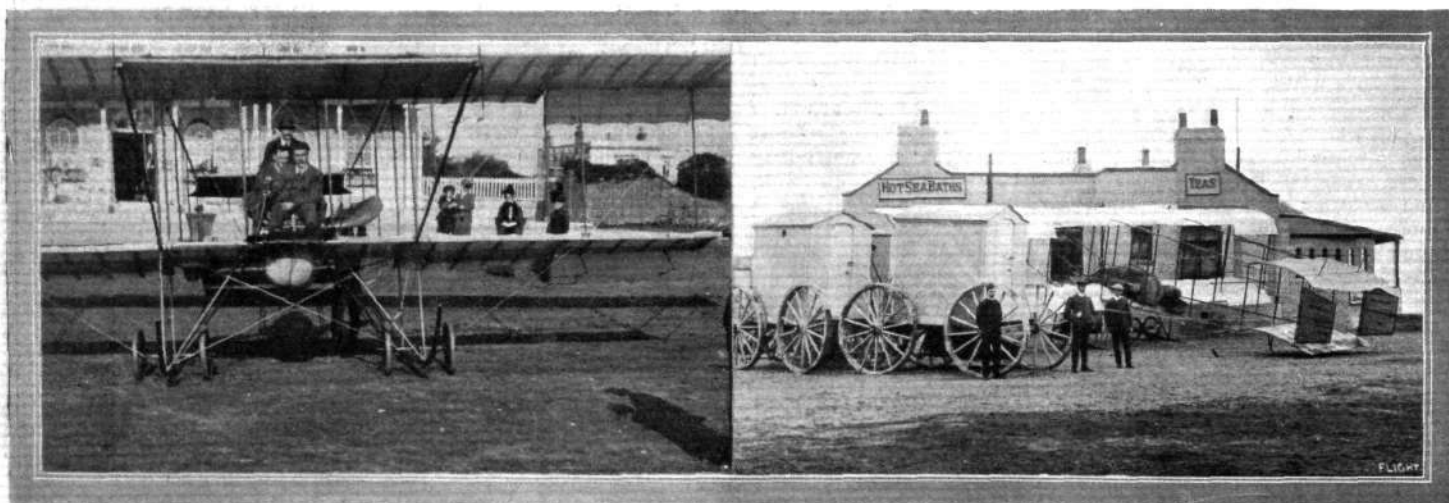
ALTHOUGH, of course, it is nothing new for boots to be carried by aeroplane, the first actual parcel of boots to be so carried was taken by Mr. W. B. R. Moorhouse from Huntingdon to Hendon last week. With a parcel containing a dozen pairs strapped on his machine, Mr. Moorhouse left Northampton, to which place he had flown on the previous day from Huntingdon, to fly to Hendon, but when between Fenny Stratford and Bletchley he was obliged to land owing to thick fog. The conditions did not improve during the day, and so he had to wait till the next day, when he completed the journey in fine form.

To Aid the Purchaser.

MESSRS. MARKHAM AND PRANCE are making a speciality of buying and selling aeroplanes, and are prepared to place their services at the disposal of anyone wishing to purchase an aeroplane. They also make arrangements to supervise any tests or trials. Their address is Dudley House, Southampton Street.

New Model Aeroplane Clubs Suggested.

MR. F. W. HALL is taking steps to form a model club in Newcastle, and will be pleased to hear from anyone interested at 100, Cardigan Terrace, Heaton, Newcastle-on-Tyne. The recent visit of Mr. Hucks to Cardiff has awakened considerable interest in that district in aviation, and it is proposed to form a model club. The preliminary arrangements are in the hands of Mr. A. C. Moreton, 55, Stacey Road, Roath, Cardiff. A junior model club for members under 16 years of age is being formed at Bristol. Full particulars can be had from Master J. Cavill, 26, Southfield Road, Cotham, Bristol.



Mr. E. Howard Pixton and his "Bristol" biplane, which he recently flew from Amesbury to Hayling Island, where he subsequently made some flights under the somewhat trying conditions of the gales which have been blowing in that district. The left-hand view shows the machine just starting for a flight in front of the Royal Hotel, with Lieut. Burney, R.N., and Mr. Farnall Thurston, of the Bristol firm, as passengers. The float under the seat should be noted, which is provided in case the machine should descend into the sea. The right-hand view shows the machine "camped" out for the night between a house and some bathing machines.

THE GYRO COMPASS.

DURING the past three years the German navy has been largely replacing the familiar magnetic compass with a gyroscopic instrument developed by Dr. Anschütz, which device is now being made in England by Elliott Bros., and is finding its way on to British ships.

At the moment, there is no likelihood of its application to aeroplanes, but this fact hardly discounts the very interesting nature of the apparatus, and the fact that practical pilots are only too willing to give attention to compasses of all descriptions is, we think, sufficient excuse for referring to the matter in the columns of FLIGHT.

Everyone knows that a gyroscope is a spinning fly-wheel mounted in gimbals, and that its principal characteristic is the manner in which it keeps its axle fixed in space irrespective of the manner in which its supporting framework may be moved around it. It is less generally known that if the framework is so arranged that the gimbals provide for free movement in two instead of three directions in space, a gyroscope will persistently point its axis due north and south.

An explanation of this action calls for a more involved treatment of the science of precession than we have space to give here. The main point to bear in mind is that, in a system as above defined, the gyroscope revolves with its axis parallel to that of the earth and constitutes, as it were, a small planet imitating the action of its sun. To those who care to make a study of gyroscopic motion, the problems involved in the gyro compass are of the most fascinating character, and incidentally no better example could be found to show how very far from being the result of a casual inspiration is the production of this apparently simple device.

Although the essential underlying principle has been known since the year 1851, failure overtook every effort to apply it in practice until 1906, when Dr. Anschütz arrived at the turning point of his long series of experiments. In the gyro compass as it exists to-day, the gyrostator is driven by a small three-phase electric motor, and its normal revolutions are 20,000 per minute. Ninety-five per cent. of the energy used in driving the flywheel is absorbed by the air friction, and the makers state that after a gyro has run a few thousand hours its surface is noticeably smoother than when it left the finishing process in the grinding machine before being put into use. We commend this remark to the attention of those who profess to ignore skin friction in the problem of flight.

One of the chief practical difficulties associated with the development of the gyro compass was to find a means of damping its natural oscillation and a particularly ingenious method has now been devised. The rotation of the gyro wheel is utilised for drawing air into the casing, whence it is discharged from an orifice partly covered by a moving vane. The balance of the gyro automatically controls the position of the vane and the reaction of the rejected air from one corner of the orifice or the other creates the steadying force required.

From the fact that it is electrically driven, may be gathered its unsuitability for aeroplanes in its present form; nevertheless it behoves aerial navigators to keep their eye on an instrument which is so far superior to the magnetic compass as to indicate a true geographical north and to be absolutely unaffected by the presence of iron and steel in its vicinity.



THE ROMANCE OF AERONAUTICS.

It cannot be denied that the story of Man's conquest of the Air from the fanciful tale of the wings constructed with the aid of feathers and sealing-wax by Daedalus down to the practical achievements of to-day is one of the most romantic which the world has ever known, and in writing a volume on the subject for the "Library of Romance" Mr. Charles C. Turner has had abundant material to draw upon. Many books have been written during the past few months, some authors purporting to deal with the subject from an historical point of view, and others confining their attention to what might be termed the practical side, being mainly concerned with recording the results of experiments made by those who have worked at the variety of infinite problems presented and the many theories which have been evolved therefrom. Of all these volumes it is the historical books which appeal to the general reader, but speaking generally, those which have hitherto appeared lack a sense of reality, mainly for the reason that their writers have had little knowledge of the subject, and so were unable to treat it in that sympathetic way which alone can make history delectable.

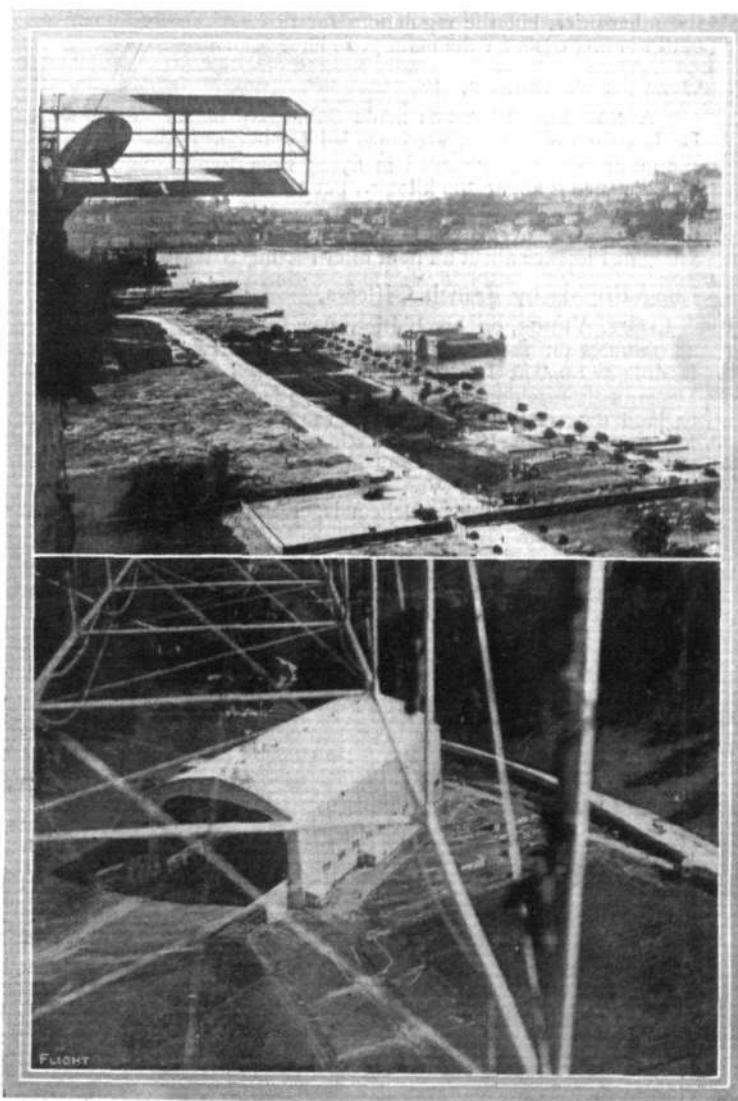
Mr. Turner approaches his task well equipped, for not only has he studied his subject for a long time, but he has a practical acquaintance with it, having graduated in ballooning, and then gone on

from that to acquire the art of *un homme oiseau*, his abilities in that direction being testified to by a Royal Aero Club certificate. And apart from this Mr. Turner is no apprentice in the art of weaving a story.

The result is one of the most welcome volumes which have appeared lately, and one which will be found enthralling by everyone who takes the slightest interest in aviation. And who does not? The dwellers in this "tight little island" may not be so demonstrative as the *bourgeois* across the Channel, but there are few now who do not realise that the aeroplane has come to stay, and that before long it will play a part—how large or how small it is impossible to say just yet—in our daily life.

Considering that for several centuries many able men had been working at the problem, it is astonishing how rapid has been the development of the aeroplane, since the memorable day in November, 1906, when Santos Dumont succeeded in keeping his unwieldy machine in the air for a distance of 238 yards. Now—well, it is unnecessary to specify, as each week the pages of FLIGHT record performances which three years ago the most sanguine prophet hardly dared to predict as possible.

The twenty-nine chapters which go to make up this book of three hundred odd closely-written pages are each brimful of interest, while there is an admirable selection of illustrations, both photographic and line drawings to help the reader. It is a book written in simple language, and should do a great deal to spread knowledge of aviation in this land. The Library of Romance is published by Messrs. Seeley, Service and Co. at 5s. each volume.



Two interesting views secured from the dirigible which has been stationed at Lucerne for regular passenger carrying. The top photograph shows a general view of Lucerne, one of the elevating planes of the airship and the tip of one of the propeller blades being seen in the left-hand upper corner. In the lower picture the housing shed for the dirigible is seen through the framework of the car.

FOREIGN AVIATION NEWS.

The F.A.I. Congress.

THE Congress of the Federation Aeronautique Internationale, which was to have taken place on November 1st, will now be held in Rome from the 25th to the 30th November.

The Michelin Target Prizes.

THE rules have now been issued governing the first of the Michelin Target Prizes, the competition for which closes on August 16th, 1912. Briefly it may be said that the prize of 50,000 francs will be given to the aviator who makes the best performance in dropping fifteen regulation projectiles, 15 centimetres diameter and weighing 7.1 kilogs., from a height of 200 metres or more into a circle of 10 metres radius. The projectiles will be provided by the Aero Club of France, or the competitors may supply their own, in which case they must be of the same volume and weight as those of the Ae.C.F. In the event of several competitors having complied with all the regulations by August 16th next, the Aero Club will draw up a special eliminating competition on similar lines, and if then there is still more than one who have fulfilled the conditions, the winner will be the aviator whose projectiles are nearest the centre of the target. During the flight no other projectiles must be launched, this rule prohibiting trial shots. The trials must be carried out on entirely French-built machines.

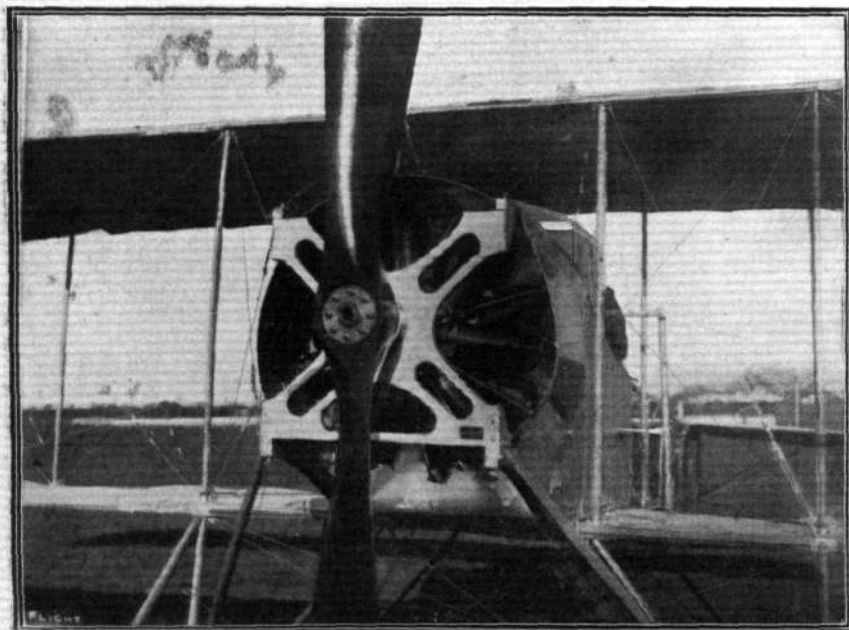
A prize of 25,000 francs will also be awarded at the same time as the other prize, but the regulations for this will not be drawn up until the first trials for the main prize have been made.

Over the Apennines.

A NOTABLE flight was made on Friday of last week, when Le Lasseur de Ranzay, accompanied by Baron Della Noce, on a Blériot monoplane, succeeded in flying from Bologna to Florence. The distance is about 100 kiloms., but the aviators had to cross the Apennine mountains, which rise to about 1,300 metres. Nevertheless they got over their task without much difficulty, and landed safely in Florence about an hour after leaving Bologna.

Long Flights by French Officers.

LIEUT. YENCE, on his Blériot, flew from Douai to St. Malo in 48 minutes on the 19th inst., after having flown from Chalons, landing *en route* at La Fere. While flying from Rheims on his Deperdussin machine on the same day, Lieut. Tretarre was obliged to land owing to the storm. At the Military Blériot School at Etampes, Captain Felix was testing one of the new two-seater military Blériot machines, and altogether he was in the air for 2 hrs. 40 mins. Lieut. Van den Vaero was flying for an hour and a half, and Lieuts. Bellemois, Escot and Jost were each flying for an hour.



The mounting of the 100-h.p. Gnome motor on the new Martin biplane.

Seven on the Sommer 'Bus.

A SPLENDID cross-country trip was made by M. Sommer on the 18th inst., when he carried seven passengers besides himself on a biplane from Rheims to Mourmelon and back in 55 mins. The passengers were Mdlle. Marvingt (weight, 67 kilogs.), Kimmerling (87 kilogs.), Crombez (68 kilogs.), Bordier (60 kilogs.), Brocart (72 kilogs.), Molla (86 kilogs.). In addition, at the start, there were 80 litres of petrol and 20 litres of oil on board.

A New Sommer School.

OWING to the increasing number of his pupils, M. Sommer is opening a new school at Vidamee, quite close to Paris. The school will be under the charge of Edouard Martin.

A British Machine Over Paris.

ACCOMPANIED by M. A. Ressjac, a well-known French sportsman, Versepuy on his Bristol biplane left Issy on the afternoon of the 19th inst. and flew over Paris, Versailles, Buc and Montelher. The flyers only returned to Issy as the night fell. On landing, M. Ressjac said he had never had such a delightful experience. Said he: "Versepuy is a first-class pilot, but I ought to add that he possesses in the Bristol an absolutely marvellous machine."

Six From Rheims to Mourmelon and Back.

ON the 19th inst. Molla, on a Sommer biplane, succeeded in carrying five passengers from Rheims to Mourmelon and back.

New French Military Antoinette Pilot.

ON the 19th inst., Lieut. Fiorellino, on his Antoinette monoplane, made the necessary tests qualifying for his military *brevet* over a course from Mourmelon to Nettancourt and back. His best time for the 102 kiloms. was 1 hr. 20 mins., while his average altitude was 500 metres.

A Monument to Chavez.

BY way of perpetuating the memory of Chavez, who lost his life after crossing the Alps, his comrades at the Paris School of Electricity, where he studied for several years, have erected at the college a simple monument. At the unveiling ceremony on Sunday last there were representatives from the Aero Club of France as well as several of the deceased aviator's companions. The monument represents Chavez's Blériot monoplane fighting its way through the clouds, surmounted by a bust of the aviator.

Lengthy and High Flying on a Deperdussin.

AT the Deperdussin school at Courcy-Betheny, on the 19th inst., Gaillard was flying on a new machine fitted with a 3-cylinder Anzani engine for 1 hr. 40 mins. On the following day, Delacour flew over to Montcornet at a height of 1,200 metres. At the Deperdussin school at Etampes, Grassi made five figure-eight tests for his *brevet* in 7 mins. 35 secs., and landed from a height of 50 metres by a *vol plané*.

From Douzy to Paris.

CROMBEZ, on a Sommer biplane, set out from Douzy, on the 19th inst., with the idea of flying to Paris without a stop, but, baffled by rain and wind, he was forced to land at Rheims, the journey so far having occupied 2 hrs. 20 mins.

More French Military Pilots.

ON the 18th inst., Lieut. Nicaud completed the tests for his superior certificate by flying from Buc to Chartres and back on his Maurice Farman machine in an hour and a half. On the following day, at the Blériot School at Etampes, four officers obtained their military certificates, these being Lieuts. Ville d'Avray, Lantheaume, De Geyer, and Capt. Jost. The course was from Etampes to Orleans and back.

President Fallieres' Flying Escort.

As President Fallieres was journeying by train from Nerac to Loupillon, on Sunday afternoon, he had an aerial escort, as Brindejonc des

Moulinais was flying in his Morane monoplane alongside the railway for several miles, greatly to the amusement of the President. He had previously flown from Grisolles to Nerac, a distance of 105 kiloms., in 1 hr. 7 mins.

A Long Flight by Senator Reymond.

SEVERAL lengthy trips have been taken by Senator Reymond on his Blériot monoplane, but his best voyage was made on Monday last, when leaving the Bouthéon Aerodrome, near St. Etienne, at 8.40 a.m., he reached Nevers at mid-day. He made a fresh start at twenty minutes to three, and two and a quarter hours later landed on the Blériot ground at Etampes at 4.45, having completed a journey of 400 kiloms. Senator Reymond is chairman of the Aviation Group in the French Parliament, and also a member of the jury in connection with the Military Competitions at Rheims. What an example for British M.P.'s!

The Quentin-Bauchart Prize.

THE results of the competition for the Quentin-Bauchart prize have now been definitely passed. Renaux (M. Farman) is awarded first prize of 30,000 frs., his distance being recorded as 6,830.75 kiloms. Helen (Nieuport) is second with 5,248.8 kiloms., and taking 15,000 frs.; Tabuteau (Borel-Morane) third, 3,030.2 kiloms., 5,000 frs.; and Vadrines (Borel-Morane) fourth, 2,334 kiloms., 2,500 frs.

Seizing an Opportunity.

TAKING immediate advantage of a lull after a storm last week, Brindejone des Moulinais set out from Lisle-en-Dodon and flew to Grisolles in 1 hr. 3 mins. Almost immediately after he had landed safely another violent storm broke over the neighbourhood.

A Deperdussin Lady Pilot.

THE Deperdussin school at Courcy, Betheny, has now a lady pilot—Mlle. Telsener—who has made such excellent progress during the short time she has been undergoing instruction that she should make the tests for her certificate very shortly.

Jose Orta Better.

FORTUNATELY, the injuries sustained by the Belgian Jose Orta while flying on a Sommer monoplane on the 12th inst. were not nearly so serious as was at first feared. He quickly recovered, and a week later was able to be at the Douzy aerodrome again.

A Sommer Military Monoplane.

TESTING a new monoplane, built by Sommer for the French Army, Bathiat, on the 18th inst., at Douzy, climbed to 420 metres in 8 mins. with a useful load of 150 kilogs. On the following day when testing a similar machine he went up 400 metres in 7½ mins.

A Wedding Gift by Aeroplane.

ON the occasion of the marriage of the Archduke Charles Francis Joseph to the Princess Zita of Bourbon-Parma, who has taken great interest in the flying carried on at Weiner Neustadt, the aviator Adolf Warchalowski flew over to Schwarzwau Castle, where the wedding took place, with a silver model of his biplane, which he presented to the bride as a wedding gift from the aviators.

New Austrian Records.

OFFICIAL recognition has now been given to Lieut. Bier's height record, with two passengers, of 1,220 metres. Two passenger distance records by Lieut. Bier have also been officially certified, the first, with one passenger, of 250 kiloms. on October 2nd, beating Level's record of 241.79 kiloms.; the second, with two

passengers, made on October 4th, when he covered 112 kiloms., beating Nieuport's record of 110 kiloms. All these are World's records, and were made on an Etrich monoplane.

At the Roumanian Army Manoeuvres.

EVEN at the recent annual manoeuvres of the Roumanian Army the aeroplane has taken its part, the Third Corps being equipped with three Farman biplanes, with Protopopescu, Negrescu, and Poly Vacas at their respective helms; while the Fourth Corps had three Blériots, piloted by Prince Bibesco, Zorileanu, and Capsa. All the aviators made good and useful flights, one of the best being a trip of an hour and a half after dark by Vacas, while another was a high flight of 1,200 metres by Capsa, a record for Roumania. To take part in the manoeuvres Vacas flew from Bucharest to Roman, a distance of 250 kiloms., in three stages, the stopping places being Buzen and Focsani.

Fatal Accident at Hanover.

WHILE flying at Schneverdingen, Hanover, on Saturday last, an aviator named Tachs fell from a height and subsequently died from the injuries received.

The Aeroplane at Tripoli.

ON the 19th inst. Capt. Piazza and four aviators, Gavotti, de Rada, Robert and Prossi, from the Pordenone school, arrived at Tripoli, and on Sunday morning Capt. Piazza on a Blériot monoplane made a flight over Tripoli. The aviators are working under very great difficulties, however, as the great amount of sand flying about makes it necessary to give constant attention to the engine.

The Australian Prize Lapses.

THE £5,000 prize offered by the Australian Government for a machine to fulfil certain military conditions has now lapsed, as there have been no entries. The acting Minister for Defence, however, intends to ask the Australian Parliament next year to sanction a similar prize, but under somewhat simpler conditions.

The Trans-American Flight.

C. P. RODGERS is still gamely struggling in his effort to fly across the American continent, although there is no hope of him finishing in time to claim the Hearst £10,000 prize. On the 19th inst. he had got as far as Dallas in Texas, 2,897 miles from his starting point at New York. He is stated to be feeling very fatigued and to have lost a stone in weight.

President Taft has Aerial Escort.

WHEN President Taft was going by train from Moberly to Sedalia, Mo., on the 30th ult., he was escorted during the last 20 miles by Hugh A. Robinson on his Curtiss aeroplane. As the aeroplane was faster than the train, Robinson was able to indulge in a few trick performances, which were applauded by the Presidential party. During the afternoon, President Taft visited the flying ground and witnessed three flights by Robinson, one of fifteen minutes, after which the aviator was sent for in order to be personally congratulated by the President.

A Wright Hydro-Aeroplane.

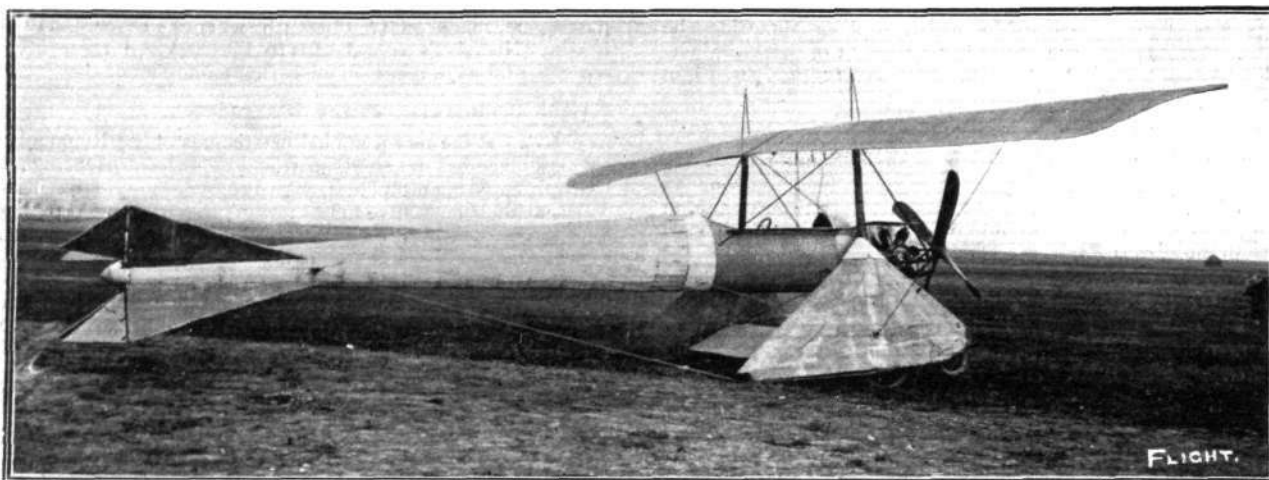
EXPERIMENTS were carried out at the beginning of the month on Lake Clare, Detroit, with a Wright standard B. biplane, fitted with two floats, designed by J. W. Hacker, in place of the usual wheels. Piloted by Frank Coffyn, the machine rose from and alighted on the water quite easily.

THE FRENCH MILITARY COMPETITIONS.

TAKING up the thread of the story from the point at which it had to be broken off in our last issue, the flying on Wednesday week was very interesting, as the weather was fine and enabled a good deal of work to be got through. In the afternoon a dozen aeroplanes, including monoplanes, biplanes and triplanes, were seen in the air. Four official tests were made, Fischer being sent first of all on his speed trials. He covered the 60 kiloms. in 42 mins. 33 secs., representing a speed of 92.3 k.p.h. Gaubert on the Astra-Wright biplane, Frantz on the Savary biplane, and Moineau on the 140-h.p. Breguet biplane, each successfully made their first landing in the stubble at Montcornet; and Barra on the Maurice Farman attempted the height test, but something went wrong with the official instruments, so that his attempt did not count. Unofficially he was stated to have got up 520 metres in 13 mins. Fischer made an unofficial height test, and got the Henry Farman up to 500 metres in 9 min. 45s. Among the other flyers seen out were Verrept on the Borel-Morane, Bouvier on the Goupy, Henry Farman flying with two passengers, Sommer with five passengers, and Didier on a

Maurice Farman biplane fitted with a Dautre automatic stabiliser. On the following day the only official tests were by Fischer, who made his two height trials, and in both reached an altitude of 500 metres in 11 mins. 55 secs.

Attracted by the accounts of the good flying which had been seen on the previous day, a large crowd wended its way to the aerodrome on Thursday, but only to be disappointed, as the cold wind and the thick mist made it practically impossible for flying to be continued after early morning. Moineau started on his official height test, but when he got up to 85 metres he decided the wind was too strong, and so came down. The other flights seen during the day were by Espanet on a two-seater Nieuport, Fournier also on a Nieuport, Henry Farman, Weymann, and Vidart on his Deperdussin. On Friday three official tests were made, Gaubert on the Astra-Wright and Frantz on the Savary making the landings at Montcornet in the long grass, while Renaux made one of the height tests on his Maurice Farman machine, climbing 500 metres in 13 mins. The wind made flying very difficult, and Barra, who intended to try for a height,



The latest Coanda aeroplane, as seen at the French military aeroplane competition at Rheims. The main plane is of 16 metres span, and the supporting surface is about 33 sq. metres. The fin-shaped lower planes fitted at an inverted dihedral angle, and the diagonal arrangement of the tail planes and rudders, is most unusual, while the machine is also unique in having two 70-h.p. Gnome engines, one being placed on each side of the fore part of the fuselage, and driving the four-bladed propeller by gearing.

gave up after rising 340 metres in 12 mins. During the morning Lieut. Tretarre arrived on his Deperdussin machine after a non-stop run from Toul. Among the unofficial flights were those made by Bregi on a Breguet, Mahieu on a Voisin, Dubreuil on the Hanriot, Colliex on the big Voisin-Canard, Prevost on a Deperdussin, Ladougue on the Goupy, Goffin on the Astra triplane, and Labouret on an Astra-Wright. Saturday was a very bad day, and no official tests were completed, although three attempts were made. Renaux started for his second height test, and reached 498 metres in 15 mins., but why he did not finish the remaining 2 metres is not quite clear. Moineau also tried for the height test, but after going 200 metres found the wind too strong, while Barra

also came to the same decision. Early in the morning Hermann arrived at Mourmelon on a 70-h.p. Pivot, and reported a very fast trip with the wind behind him. In view of the bad weather very few of the pilots were on the ground, but short trips were made by Bouvier and Didier. Sunday was completely blank, as the wind and rain rendered it practically impossible to even open the doors of the hangars. The same conditions continued until the afternoon of Monday, when in spite of the wind, Gugenheim on the repaired Henry Farman machine, recommenced his landing tests by flying over to the stubble field at Montcornet. Barra also tried for height, but found it impossible to continue, and that ended the flying for the day.

✱ ✱ ✱ ✱

AIRSHIP NEWS.

"Schwaben" Goes to Berlin Again.

ON the 16th inst. the Zeppelin liner, "Schwaben," with nine passengers on board, made an excursion of 2 hrs. 35 mins. along the Valley of the Rhine from Dusseldorf, and on Thursday of last week it returned to Berlin. Dusseldorf was left at ten minutes to five, at 8.40 Bremen being passed, Hamburg at 11.30, the 250 kiloms. to that point having been covered in 6 hrs. 40 mins. Continuing on its way the dirigible arrived at Johannisthal at ten minutes to four, the full distance of 450 kiloms. having taken 11 hours. Twenty persons were on board, including five passengers. On the 20th inst. the vessel was taken over Berlin for a short trip.

Trials with the "Schutte Lanz."

ON the 18th inst., the new airship "Schutte Lanz" was brought out at Mannheim, and with Captain Mueller in command, cruised for an hour and ten minutes over the Rhine until reaching Spire. As the rudder apparently was not working properly the airship was then brought down, and after repairs had been executed, which necessitated the airship remaining in the open all night at Spire, the return journey to Mannheim was made in an hour in the early hours of the following morning.

"Parseval VI" Over Berlin.

WHILE the "Schwaben" was making a trial trip in the neighbourhood of Berlin, on the 20th inst., "Parseval VI," with a dozen passengers on board, and Major Parseval in command, left Bittersfeld, and landed at Johannisthal after being in the air for 1½ hours.

The New Military Zeppelin.

THE new German military Zeppelin "LZ No. 9" left Oos at a quarter past seven in the evening of the 18th inst. on its 20-hour trial trip imposed by the Minister of War. With Count Zeppelin in command it passed over Mayence and Coblenz, and at nine o'clock the next morning was over Landau. The vessel continued to cruise about the Rhine Valley until three o'clock in the afternoon, when it landed at Oos, after having covered about 800 kiloms.

From Toul to Nancy.

ON the 19th inst. the dirigible Adjutant Vincenot left its hangar at Toul and cruised over to Nancy and subsequently returned without incident to its headquarters at Toul.



In 1869 Mr. H. Lee, the grandfather of Mr. C. Lee, Chairman of the Manchester Aero Club, purchased at San Francisco a number of stereoscopic slides, amongst them being the one reproduced above, which the other day just escaped being destroyed with a lot of other out-of-date photographs. It is an interesting example of "dirigible" work of forty years ago, the propellers and steering tail being suggestive of the most up-to-date methods of to-day. The legend under the original photo, published by Messrs. Thomas Houseworth and Co., of 317-319, Montgomery Street, San Francisco, is "The Aerial Steam Navigation Co.'s Steamer Avitor." Possibly some of our readers may be able to give a hint.

INTERESTING EXPERIMENTS WITH PROPELLERS AND SPINNING MODELS.

AN ACCOUNT OF SOME CURIOUS AERO-DYNAMIC PUZZLES AND AN EXPLANATION OF THE SWERVING CRICKET-BALL.

ONE of the most interesting lectures on the subject of aerodynamics which has been delivered in this country was that which Mr. Patrick Alexander gave before the

Experiment II.

Taking another propeller having solid blades, and mounting it on the spindle in the place of that having adjustable blades, Mr. Alexander again carried out a somewhat similar experiment. The free propeller was maintained in motion by the moving column of air, and not only did it revolve, but it immediately became evident that the whole propeller was advancing slowly but surely along its spindle in the teeth of the wind, thus showing that its own rotation, considered as an independent screw, was producing propulsive effort capable of overcoming the resistance of the air from which it derived its own power of rotation. Each propeller-blade was, in fact, soaring.

Experiment III.

Still keeping the motor-driven propeller in operation, Mr. Alexander took a sheet of tin, and held it vertically at the side of the propeller as close as possible to the tips of the revolving blades (Fig. 2). Then he slowly moved the plane away from the periphery, and the propeller was seen to follow it by attraction, the entire motor swinging round upon its pivot. This experiment was

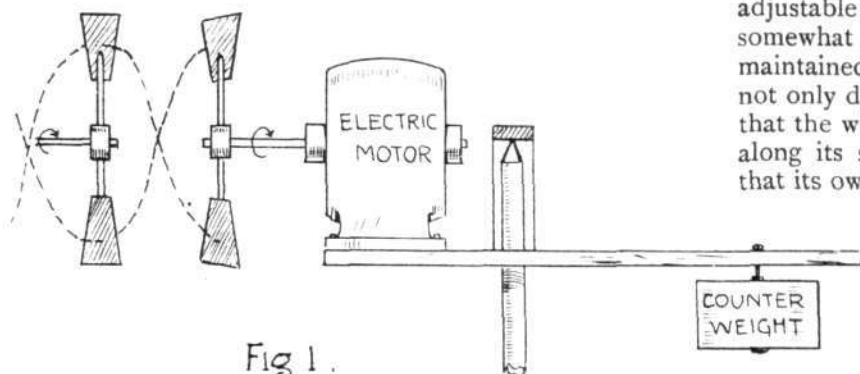


Fig 1.

Aero Club at King's College towards the end of 1906, and as the occasion antedates the appearance of FLIGHT, we do not doubt the reference to the subject will be fresh to many of our readers; in any case, we have taken the present opportunity of adding to the very interesting subject which Mr. Alexander then introduced.

Mr. Alexander's great forte is the making of experiments, and his lecture gained its charm from the practical demon-

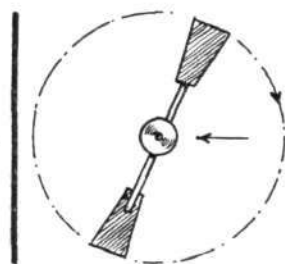


Fig 2.

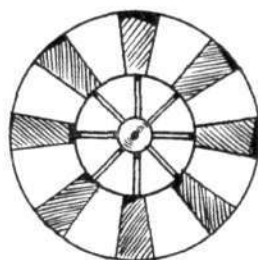


Fig. 3.

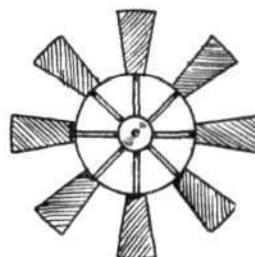


Fig 4.

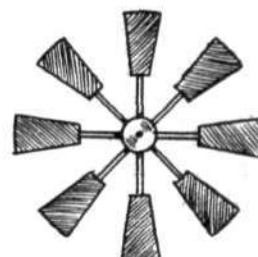


Fig 5.

strations which he was enabled to give by the aid of a very simple apparatus, consisting of a small electric motor mounted on a balanced beam which in turn was pivoted upon a vertical spindle. The motor was thus so arranged as to be sensitive to any forces brought to bear upon it, and would tilt or sway according as the pressures might be longitudinal or transverse.

Experiment I.

On the end of the motor spindle a small two-bladed propeller was fitted, and, picking up another propeller, the lecturer mounted it upon a spindle which he held in his hand, and placed it opposite to that which was motor-driven (Fig. 1). The propeller which Mr. Alexander held in his hand was fitted with adjustable blades, and on placing them so that they lay parallel with the axis of the spindle, the screw (or paddle wheel as it had thus become) revolved rapidly in the same direction as the motor-driven propeller, thus proving that the column of air in which the blades were situated was following a spiral path.

This fact was confirmed by altering the pitch until a position was found in which the blades lay parallel with the air-current, when the propeller remained stationary.

direct evidence that the presence of the plane enabled the revolving propeller to form a partial vacuum on that side, thus upsetting the equilibrium of the apparatus as a

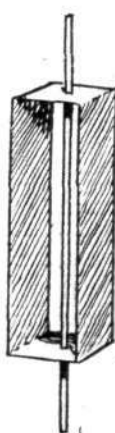


Fig. 6



Fig. 7

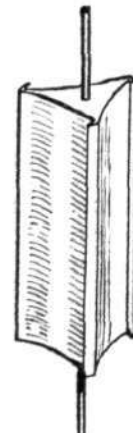


Fig. 8.

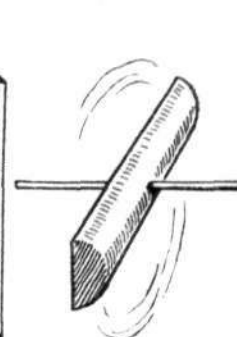


Fig. 9

whole. Supposing, therefore, that the motor had been fixed instead of pivoted, some portion of its energy would still have been wasted in maintaining this difference of pressure.

"Air entering the propeller," said Mr. Alexander, "rushes in from the circumference towards the centre, and it is not desirable, therefore, to shroud the tips of the propeller-blades as is illustrated in Fig. 3." A propeller of this type, however, with a shroud on the inner ends of the blades, Fig. 4, Mr. Alexander considered to be better than one having the blades quite free, as in Fig. 5. Dealing with the relative positions of propellers on a complete flyer, Mr. Alexander very naturally favoured, as a result of these experiments, that type in which the propeller is situated well behind the decks, for, as he pointed out, if they are placed between the decks the feed is interrupted.

Experiment IV.

This experiment, as well as those succeeding it, related to the behaviour in rotation of special forms.

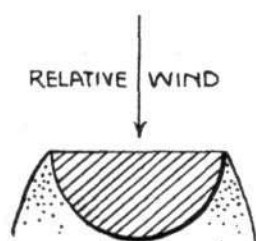


Fig. 10

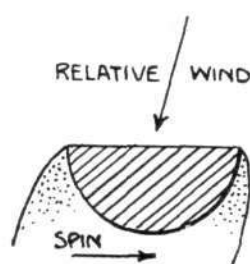


Fig. 11.

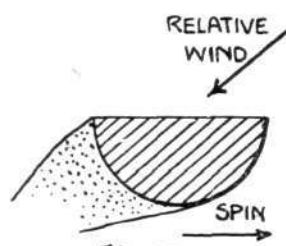


Fig. 12

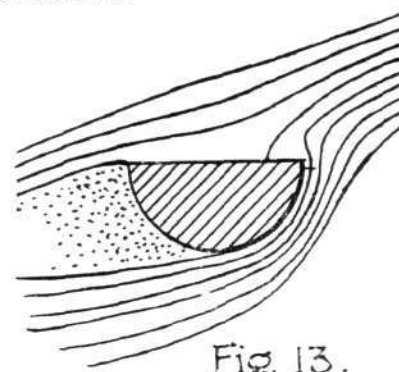


Fig. 13.

The first model employed consisted of an open rectangular frame (Fig. 6) mounted on a vertical spindle passing through its longitudinal axis, and set spinning by hand while held in the air current produced by the motor-driven apparatus already referred to. Once it had been started the body continued to spin at a uniform speed so long as the air in which it was situated remained in motion.

Experiment V.

Another model (Fig. 7) of solid triangular section, but having concave faces similarly mounted, and set spinning, almost immediately came to rest.

It is interesting to remark in connection with this experiment that there have since come into use as advertisement signs in London, a modified form of this model in which the vertical edges are provided with projecting lips (Fig. 8). This addition just makes all the difference, for the device continues to rotate all day long in the air-currents which are never absent from city streets.

Experiment VI.—The Aerial Tourbillon.

This particular experiment relates to one of the most interesting of aerodynamic problems, the apparatus of which consists in no more than a simple stick of semi-circular section, which is drilled with a hole through the centre of the flat face, so that it can be mounted transversely like a propeller on a spindle (Fig. 9). If set spinning with its convex surface facing the draught, this device invariably comes to rest, but if set spinning with its flat face against the wind it actually increases its speed, and this happens irrespective of the direction of its initial spin. It is a condition of the success of this experiment, however, that the initial spin shall be fast enough.

A very interesting solution to this particular puzzle has been provided by Lanchester in his "Aerodynamics," and is included in that section of the book which deals with fluid resistance, and the effect of surfaces of dis-

continuity. Both subjects are of vital importance to the aviator, and thus there is a distinctly practical side to an investigation of the problem.

Set truly at right angles to the draught, as, for instance, by being held outside the window of a railway carriage at speed, the tourbillon evinces no tendency to rotate at all, and the aerodynamic conditions surrounding it are explained by Lanchester to consist of a divided air stream which spews out from the edges of the flat face and encloses a deadwater region (Fig. 10) behind the stick before the two currents finally come together again. It is this deadwater which is bounded by the surface of discontinuity, and a section through the stick under these conditions would disclose a symmetrical arrangement of the surface about it.

If, however, it be supposed that the stick is in rotation the symmetrical disposition of the deadwater is disturbed (Fig. 11), and the surface of discontinuity begins to approach closer to the real surface of the stick on one side. There finally comes a time when the spin artificially imparted to the stick is adequate, when the deadwater is entirely displaced from that side altogether, and the wind suddenly gets a bite on the wood (Fig. 12), the resultant system of flow being illustrated according to Lanchester in Fig. 13, who thus describes the forces in action. "Here the pressure on the left-hand side will be that of the deadwater, which is, as we know, somewhat less than that of the hydrostatic head, while that on the right-hand side will, owing to the centrifugal component of the stream, be very much lower; that is to say the rotor will experience a force acting from left to right, which is in the direction of the initial spin, so that the motion will be accelerated and will continue. The fact that the propelling force only comes into existence when the initial spin is sufficient to eject the dead water from the leading side of the rotor blade, fully explains the observed fact that a very considerable initial spin is necessary."

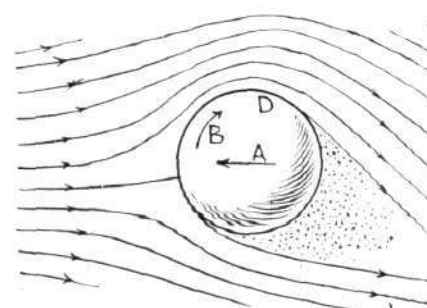


Fig. 14

The Swerving Cricket-Ball.

Directly arising out of these considerations is a theory offering a solution to a phenomenon well known to all exponents of our national sport, the swerving cricket-ball. It is again a problem associated with stream lines and deadwater, and has thus been investigated by Lanchester. "Let a ball (Fig. 14) moving in the

direction of the arrow, A, have a spin in the direction of the arrow, B. Now where the direction of motion of the surface of the ball is the same as the relative motion of the fluid, as at D, the surface will assist the stream in ejecting the deadwater, so that the discontinuity will be delayed, and will only make its appearance at a point some distance further aft than usual. On the other hand, on the side that is opposing the stream, the surface of the ball will pump air in, and so assist the discontinuity, which will make its appearance prematurely. The net

result of this is that the counter wake will have a lateral component (downwards in the figure), and on the principle of the continuous communication of momentum there will be a reaction on the ball in the opposite direction, that is to say upwards. A ball may, therefore, be sustained against gravity, or be made to soar, by receiving a spin in the direction shown, or if the spin be about a vertical axis the path of the ball will be a curve (in plan) such that the aerodynamic reaction will be balanced by centrifugal force."

NOTES ON FALLING BODIES.

MORE or less in the same category as the above are phenomena that may be observed in connection with certain falling bodies. A thin plane, such for instance as a half sheet of note paper, is in unstable equilibrium if let fall edgewise, and although this position is apparently that of least resistance such as should result in a direct drop to the ground, it will be observed that the paper invariably swerves into a horizontal position, and then either zigzags to and fro or commences to rotate about its longitudinal axis. While thus rotating, it continues to fall, but the fall takes place at a uniform rate, and not with acceleration as would be the case with a mass like a stone. It has been suggested that this property could be turned to some practical account in the form of a rotary parachute (see "Flight Manual," Note 80), but we are not aware of any actual example in which this has been done. On the other hand we know of model experiments that are being carried out with a machine in which the elevator and tail plane are allowed to rotate on this principle.

The leading theory associated with the above-mentioned phenomenon is that the most minute deviation of the attitude of the plane from the truly vertical (such as would be accounted for by the least inaccuracy of launching or the faintest suspicion of a draught), sets up a virtual angle of incidence in respect to the initial flight path. This is at once followed by an advance of the centre of pressure

towards the leading edge, and since the centre of gravity is located in the centre of figure a couple is immediately formed that tends to still further increase the deviation. This in turn results in a still further advance of the centre of pressure, and the deviation is augmented until the plane becomes horizontal, whereupon it may either rotate or slide backwards, according to the prevalence of certain factors, the precise nature of which is somewhat obscure.

If the shape of the plane that is experimented with is not rectangular, so that the centre of gravity does not lie in the centre of figure, it is possible that a position of stable attitude may be attained after one or more oscillations. If a sheet of paper is cut in the shape of the letter T, for instance, it will remain stable if dropped tail first, but unstable if dropped head first. This experiment incidentally affords an ocular proof of the superior efficiency of high aspect ratio.

The phenomenon of rotation is also demonstrated by a falling prism. If a sheet of note paper is folded in three, and the adjacent edges gummed together so that the structure thus formed constitutes a hollow triangular prism, the object will rotate about its longitudinal axis while falling through the air. It is immaterial in what position the object be initially launched, it will invariably modify its attitude until its longitudinal axis is horizontal, although the actual dimensions of the model may affect the time required for the change of position.

CORRESPONDENCE.

* * * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which have appeared in **FLIGHT**, would much facilitate ready reference by quoting the number of each letter.

Not Productions of Farman Frères.

[1401] Our attention has been called to some recent issues of your paper wherein some of your correspondents have named certain biplanes used at Brooklands "Avro-Farman" and "Spencer-Farman" machines respectively, and in order that the public generally may not be under a misapprehension, we desire to say the machines so described are not joint productions of our firm and other firms, and we have never authorised the use of our name of Farman in this manner, and very strongly object to it.

We feel sure, in the circumstances, and with your accustomed courtesy, you will be willing to insert this letter in your paper.

22, Avenue de la Grand Armée, Paris. FARMAN FRÈRES.

Naturally Stable Machines. The "Redivalls" Monoplane.

[1402] The Rev. Harold Kelk is evidently a firm believer in the rapid self-righting capabilities of my monoplane (No. 1394). I wish I could equally convince the managing director of one of our premier aviation companies. I thank him for his congratulations and for the splendid way in which he upholds my invention. It may interest your readers to know that my patent is granted, sealed and published. My experiments date back over two years. In my "Redivalls" monoplane I claim to have successfully obtained the most efficient non-mechanical *natural rapid self-righting* method obtainable.

Your worthy correspondent (who, by the way, is a total stranger to

me) remarks that the monoplane with dihedral-up-angle fitted with a point-down box-plane, &c., will recover an even keel *immediately*, however much it may have canted over, even if it should have been *entirely capsized*. The fact that I launch my monoplane *vertically* proves this. I gave the members of the Manchester Aero Model Club several flights to-day (October 21st). The only mishap I had was when I foolishly lowered the elevator too much. It dived to the ground, broke the front skid (elevator protector), and the lower half of the elevator's irregular diamond centre. It is worthy of note that it had righted itself, inasmuch that the main plane was not even touched. A few minutes with needle and thread making it all right again, it was soon again demonstrating its self-righting capabilities to the interested members of the club.

I hope to put in an appearance again at Trafford Park on October 28th. After that date, I am willing to attend with my monoplane at any model club flying meeting within a reasonable distance of Manchester, upon receiving notification from the secretaries, giving provisional dates for my selection. I will pay my own expenses. My object is to make converts. If I had £1,000 to spare, and a private income of £3 or £4 per week, I have no doubt that a full-size machine would have been flying ere this. A modern positive dihedral-angled monoplane only requires four panels secured in the form of an irregular diamond in the centre of both main plane and tail. The lower panels would be larger than the upper, in order to counterbalance the wind resistance in a side wind of the latter plus the wind resistance of the planes having dihedral angles. The gyroscopic action of two propellers or tractor screws rotating in opposite directions and suitable shock absorbers would, in my opinion, give the ideal *natural rapid self-righting lateral-stability monoplane*.

Eccles.

WILL. H. BOOTH ("Redivalls").

Prizes at Brooklands.

[1403] I notice that in your issue for October 14th Messrs. A. V. Roe and Co. advertise that the third prize at Brooklands on October 4th was won by an Avro pupil. I beg to point out to you that this is incorrect, as it was won by myself on a Spencer biplane, and I have never been connected with the Avro School.

HERBERT SPENCER.

Brooklands Aviation Ground.

The Aeroplane in War.

[1404] You must allow me to put my case a little plainer in answer to your last editorial. I don't think anything I have written can be construed to mean that the aeroplane is to be the "destroyer of the air" in the near future.

I expressly said that the gaining of intelligence is the first duty of an aeroplane, and your readers will doubtless realise without difficulty that, if it is most important for a force to get information of the enemy, it is equally important for the enemy to prevent its doing so. Will the side which possesses 100 aeroplanes against its enemy's 50 be content with a simple exchange of information across the frontier, or will it devote 50 machines to counteract the enemy's while the other 50 gain information? If the thing is worked out on the basis of cost, I think you will find in a year or two that the cost of, say, five aeroplanes, will work out to about the same as 100 cavalry horses; and, say, £4,000, their upkeep, including replacements, would be not more than that of 100 mounted men, probably less. Consequently, by reducing its cavalry force by 1,000 men any country could keep 50 aeroplanes on present expenditure. Now the present strength on mobilisation of the cavalry of the principal powers is as follows:—Russia, 111,000; Germany, 76,000; France, 66,000. Does it not appear from this that we are likely to have plenty of aeroplanes on both sides in the next European war? I think so. The Franco-German frontier is, I think, something less than 150 miles long. Suppose each power has 200 aeroplanes, surely there will be "wings on the green" at the outbreak of war before much information is gained by either side. It is surely not possible to question the fact that machines run by men like Beaumont and Vadrines would be ordered to destroy as many of the enemy's aircraft as possible—that is, of course, if a satisfactory way of arming them has been elaborated.

But even taking your own analogy with cruisers, which I cannot admit to be very apposite, you must remember that armour and guns in a cruiser come next after speed. I am suggesting the arming of aeroplanes in the same way.

The cruiser analogy seems to me weak for this reason. The cruiser has an advantage of, at most, a third more speed than its battleship squadron, and so cannot go far from it. An aeroplane can go 60 or 90 miles in an hour, while its infantry goes 3. The aeroplane is much more "on its own" than a cruiser, and I don't see how it can be expected to carry out its mission with the necessary confidence and resolution unless it has means of defending itself and attacking its adversaries. I am quite with you that when told off to scout an airship of any kind should not fight unless absolutely necessary. Neither should cavalry.

Now for bomb dropping. How else is an aeroplane to destroy a dirigible in a safe and certain way?—and planes must destroy dirigibles, as they can send information back for hundreds of miles with powerful wireless installations. Having once installed your bomb tube why not utilise it for general purposes? it is the "soul of artillery without the body" as Congreve claimed for his rockets, only rather more so. No powder charge entailing a strong and heavy gun to stand its explosion; beneficent gravity provides the necessary impulse. "Take the good the gods provide!"

One more point, and that is the steady platform for a maxim that you ask for. The reason I suggested a maxim when others of your correspondents were talking of guns with chain shot, and other curiosities, was that the maxim is the only weapon that would be effective (of course, only at short ranges), on an unsteady platform. When you press the button on a maxim, a stream of bullets—ten every second—leaves its muzzle. If your gun is quite off the target (which is, we will say, another aeroplane 600 ft. or 700 ft. away), you raise your thumb and the stream ceases; as soon as you get on, or nearly on, you press again, and the unsteadiness of the platform gives such a spread to your bullets that some are pretty sure to take effect.

It must be remembered that the flame from the muzzle of any firearm means a certain danger when petrol is in the neighbourhood. Some silencer arrangement, with battle plates, fixed on the muzzle would reduce this risk. An air-gun giving sufficient velocity would be the ideal weapon.

R. A. (RETIRED).

Aviation at the Scottish National Exhibition.

[1405] As a keen student of aviation, and also a frequenter of the Exhibition, I have naturally spent a great deal of time in the

aviation pavilion. My reason for writing to you is to take up the cudgels on behalf of the model exhibitors. On passing round the pavilion the other evening, I noticed, not without a feeling of great indignation, that not one of the scale models is in a whole condition. By this I mean to say that some are totally wrecked, others have had their propellers stolen, even one has had a most excellent copy of the Gnome motor and Chauvière tractor ruthlessly torn from its housing in an equally excellent scale Blériot. Who, I ask, is really responsible for the safe-keeping of the models sent? There is one attendant in the place, but he cannot be expected to keep his eyes all over the shop at once.

Is it fair, I ask, that young enthusiasts should lay out the necessary cash to build a scale model and pay carriage and packing to the exhibition, and then wait for the model to be sent back to them—in pieces, perhaps?

There is a prize of five guineas for the best scale model, and one of two guineas for the second best. The judging has not yet taken place, notwithstanding the fact that several of the model exhibitors were informed that models must be forwarded at least three clear days before the exhibition opened in May. Now, how is anyone to judge a model which, though thoroughly well made, is devoid of propeller and engine, and with chassis looking sadly ill-used?

Might I suggest that the authorities, who have to do with the prize-money, make same up to ten guineas, and divide equally among the exhibitors who had entered for the scale-model competition?

I trust you will forgive me taking up your valuable time, and that you will give this letter the publicity it deserves.

Glasgow.

MODEL EXHIBITOR.

Aeronautical Patents Published.

Applied for in 1910.

Published October 26th, 1911.

- 22,710. S. F. CODY. Aerial craft.
- 25,488. M. A. PARASINO. Flying machines and dirigibles.
- 25,544. J. J. LINZELL. Aeroplanes.
- 25,749. G. MEES. Automatic control and steadying of aeroplanes.

Applied for in 1911.

Published October 26th, 1911.

- 2,029. G. H. CHALLENGER AND BRITISH AND COLONIAL AEROPLANE CO. Flying machines.
- 5,843. T. A. TANNER AND B. F. MILLER. Flying machines.
- 9,109. M. OUSCHKOFF. Aeroplanes.
- 11,139. A. J. A. DEPERDUSSIN. Aeroplanes.
- 12,099. J. J. DAY. Flying machines.
- 14,350. H. GAARA. Aerial machines with two or more motors.
- 14,937. M. A. FARMAN. Steering-gear for aeroplanes.

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